Sensitive Significance

Exploring Human Wellness
in the Built Environment

Kerry Anderson

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Exploring Human Wellness in the Built Environment

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By

Kerry Anderson

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Primary Thesis Advisor

05/12/11
Thesis Committee Chair

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Name: Kerry Anderson

Date: 5/12/11

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Abstract

This thesis studies the question of how the quality of the built environment affects all aspects of well-being in its users. The topic will be explored through mixed method research with an emphasis on the relationships between human well-being and the built environment, with additional focus on the quality of design relating to architectural tectonics. The building typology used to delve into this question is a cancer treatment center located in Blue Earth, Minnesota. The treatment center will be operated as a satellite of the United Hospital District, and will seek to have architecturally positive impacts on the people who interact with the building, including patients and doctors, as well as other staff and visitors.

Statement of Intent

Problem Statement

How does the quality of the built environment affect all aspects of well-being in its users?

Statement of Intent

Project Typology

Cancer Treatment Center

Claim

Architectural tectonics have a positive, benign, or negative influence on the perception and physical wellness of those who interact with the built environment.

Premises

Architectural tectonics form the backbone of quality design. They deal not only with what materials are chosen for a building, but also with how those materials and components are assembled. Each of these choices in the design process profoundly affect the quality of the resulting built environment.

The relationship between people and the built environment is a constant yet ever-changing element of life. As products of human design, buildings have the potential to dramatically influence the well-being of the humans who interact with them.

A person's total wellness is dependent on many factors, including those that are environmental, specifically resulting from immediate built surroundings.

Theoretical Premise/Unifying Idea

The built environment has the potential to positively influence the well-being of the people who interact with it.

Project Justification

Human wellness is subject to many different factors, but one that has been overlooked is the interaction between people and their built surroundings. Design has the opportunity to make more positive impacts on the people who experience it, rather than simply neutralizing any negative effects of a built environment.

Proposal

Narrative

Imagine a small town of less than 5000 residents situated among the corn and soybean fields of southern Minnesota. Imagine that you (one of those residents) have just visited the small hospital/clinic facility for a check-up and have been told that some abnormalities have surfaced in that routine examination. Imagine with me that you have been referred to a doctor in a larger city that is an hour's drive away in order to be tested for various serious diseases. Imagine returning from that appointment to those horrendous hours, days, and weeks of waiting for the phone call that will determine your quality of life for the next months and years. Yes, imagine receiving that phone call from the oncologist telling you that they have found cancer in your body.

A cancer diagnosis is never received with joy. There is very little comfort in such news, even for the most optimistic patients. In rural southern Minnesota, however, the situation tends to worsen with the scarcity of cancer treatment facilities. Most small towns have some sort of hospital or at least a clinic, but few of those facilities are equipped to diagnose cancer, much less treat it. This means that on top of an already stressful medical situation, the fact that residents must travel anywhere from 25 to 100 miles for treatments can weigh heavily on their minds. In some cases, personal transportation is not available. For those who do not have family in the area to fall back on, they must rely on volunteer services to get them to their appointments. The volunteer response is admirable, and it is a solution, but a better solution can be designed: a solution that will stimulate well-being both in the mind and body. This solution will relate to architectural tectonics, the direct influence buildings have on human well-being, and the factors of wellness.

The tectonics of architecture are what drive the quality of the built environment. But what is "quality of the built environment"? Does it vary for different people and situations, or is there an accepted definition that spans all building types, situations, and climates? The main question raised by this idea is what the quality of a building means to a cancer patient. Regardless of any technical definition that may be found, how does "quality of space" translate to the cancer patient sitting in a chair receiving chemotherapy? The answers to these questions will profoundly influence the direction of the design.

Narrative

A person's relationship with the built environment happens on the perceptual level as well as the physical level. Perceptually, his or her reaction to an environment directly correlates to a personal definition of "quality of the built environment." Quality, however, is something that, once established, can be taken for granted. How does a person's perception of a space stay fresh? More importantly, how can negative mental associations with a "quality" space be avoided if both physical pain and bad news are constantly received and given in those spaces?

A person's physical reaction to the environment is just as important as the perception of the same space. This idea also relates back to architectural tectonics in that the materiality and means of connection are influences on well-being. Are there particular materials that should be avoided for sensitive medical facilities, and what are their effects on humans? Are there ways to include a sense of richness and vibrancy in material choices while respecting the well-being of building occupants? By taking a very studied look at how humans interact with their built environments, these issues will find resolution.

Human wellness is composed of many different factors, all with implications in daily life. Concerning the built environment, its effect on wellness is not always limited to the person's time spent in a particular place. A person's environment has the potential to have a lasting impression within the body. In many cases, prolonged exposure to hazardous substances will result in cancer years after being removed from the particular environment that caused the damage. Does the built environment have influence over more than just the physical aspect of wellness, and if so, which areas does it influence? What does "wellness" mean to someone diagnosed with cancer? Understanding human wellness and the implications of the built environment will be key to answering these questions.

All of these questions are interrelated and will ultimately form the basis of researching the theoretical premise that "the built environment has the potential to positively influence the well-being of the people who interact with it."

User/Client Description

Client

The owner and operator of the facility will be the United Hospital District, the same owner and operator of the UHD Hospital and Blue Earth Clinic. The cancer treatment facility will operate as a satellite of the hospital. Some forms of treatment, such as surgery, may require the patient to be admitted to the hospital for the necessary procedure. Certain tests, such as diagnostic imaging, may also require the patient to use the hospital facility in lieu of the treatment center.

Patients

The patients using this facility will be in various stages of cancer and will be receiving various forms of treatment throughout their visits.

Doctors/Medical Staff

Medical staff at the treatment center will include oncologists, nutritionists, and nurses. While this will be their primary place of work, some cross-over between the treatment center and the Blue Earth United Hospital District facility may be necessary.

Community Members

Although community members will not be interacting with the treatment center on a daily basis, the nutrition shop will be available to them as a resource. Interaction may also happen on a volunteer basis either directly through the treatment center, or through community groups such as Interfaith Caregivers.

User/Client Description

Number of Occupants

Staff members will comprise of about 25-30 occupants on a daily basis. The number of patients seen per day will depend on their doctor's scheduling. Light public traffic will be expected through the nutrition shop.

Peak Usage

Peak use times will be normal business hours on weekdays, with more limited use on weekends.

Parking

Patient parking will be on the street as there is ample parking on both Main and 5th Streets. A small parking lot will be provided for employees.

Physical Restrictions

Due to the debilitating nature of cancer, it is expected that some patients will have limited mobility. The design will make sure that these patients are treated with respect.

Medical/Mental Health Issues

All patients directed to this facility will be dealing with major medical issues. With such life-changing illnesses, some mental health problems may manifest in some patients.

Social, Cultural, Economic, Ethnic Issues

In a small town used to the status quo, choosing alternative medical treatment over conventional care may be looked down upon.

Major Project Elements

Reception/Records/Patient Check-in

An administrative office with medical record storage space will also serve as the reception desk for patient check-in and general information.

Chemotherapy treatment rooms

This set of spaces will be used most often for patient treatment, and therefore should be designed with the patient in mind. While chemotherapy may be the most common treatment, these rooms would also be available for various alternative treatments.

Radiation treatment room

As another common treatment method, this space will be in use for very short amounts of time by many individual patients.

Nutrition shop

The nutrition shop will be open to the public and provide access to supplements and foods that aid in preventing and fighting cancer.

Gathering space

The gathering space will be a multi-function area that will primarily be used for group therapy sessions. Other uses may include educational classes and social activities.

Doctors' offices

Offices will be used for administrative duties as well as patient consults.

Laboratory

Medical tests will be carried out in the lab.

Reading/Resource area

A good patient is a knowledgeable patient. The resource area will house medical literature and a reading area to enable patients to learn more about their conditions and treatment options available to them.

Support Spaces

Restrooms
Storage
Mechanical/Electrical
Maintenance spaces
Circulation

Site Information

Importance

This project's location is in the downtown area of Blue Earth, Minnesota. The location has special significance for several reasons.

First, Blue Earth's downtown has been slowly dying over the past ten years. This specific site is an empty lot in the middle of downtown, which has not even been transformed into extra parking due to the overabundance of unused parking in the area. It is empty and lifeless--the perfect opportunity to infuse some hope back into a small city's downtown.

Second, Blue Earth's hospital does not include an oncology department. In fact, the closest town that can provide cancer treatments is about 25 miles away. If any complications arise in the course of the disease or treatment, a patient must travel even further to either Mankato, Minnesota (45 miles) or Rochester, Minnesota(102 miles). This cancer treatment center would serve more than just Blue Earth, but also the many townships and small towns in the surrounding area.

Site Information

Southern Minnesota

Located in extreme southern Minnesota, this region of the state is characterized by warm summers and frigid winters with fair amounts of precipitation all year round. Farming plays a huge role in shaping the culture in this area of the state, as does the prevalence of small towns.

The town is located near the junction of U.S. Interstate 90 and Minnesota Highway 169, offering direct links to surrounding communities as well as "destination" cities such as Mankato, Rochester, and (on the larger scale) Minneapolis.

Site Information

Blue Earth, Minnesota

Blue Earth is located in Faribault County. The county was established in 1856 and Blue Earth was selected as the county seat that same year. At its founding, Blue Earth's population was 15 residents. Today, the town has grown to around 3500 residents, plus about 500 more residents in the nearby township (Blue Earth City, 2010). Blue Earth was named for the Blue Earth River, which surrounds the west, north, and east sides of the town with two branches of the river.

The main circulation routes to the surrounding communities and farms are MN Highway 169 and Blue Earth's E 7th Street, which is also Faribault County Road 16. CR-16 runs east through town parallel to U.S. I-90 and is an excellent alternative route in an area of the state where interstate exits are scarce. The town itself is laid out on a grid system with numbered streets running east-west and named streets running north-south.

Site Information

Corner of Main and 5th Street

The site is an empty lot on the corner of Main and 5th Street in downtown Blue Earth. Street parking in this area is plentiful. There are parallel parking spots on Main in front of the site, and there are angled pull-in parking spots on 5th Street. In spite of the lot being empty, the city has kept a well-maintained flower pot on the sidewalk bordering Main Street.

Directly north of the site is Southern Jack's Bar and Grill. The front façade extends slightly past the building edge, suggesting that whatever structure stood on the site previously was connected to the bar and grill.

Across Main Street to the east are some street-front buildings that appear to be empty at the present time. Across the intersection to the southeast is the post office.

To the south, across 5th Street, there is an insurance office (east) and law office (west) with an alley separating the properties.

West of the site is the STEP Employment building and a sandy lot that is posted as VFW parking.

Site Information

Views

View from South

View from East

View from West

Project Emphasis

As I explore the the influence of the built environment on human well-being, my research will focus on what it means for architecture to be sensitive. This idea embodies the relationship between well-being and the built environment and also offers an opportunity to study how architectural tectonics influence perception of space.

Plan for Proceeding

Definitions of Research Direction

Research will be conducted in the areas of the theoretical premise, project typology, historical context, site analysis, and programmatic requirements.

Plan for Design Methodology

The design method used will be mixed method quantitative and qualitative analysis along with graphic and digital analysis. In addition, interviews will be conducted with individuals.

The mixed method research will follow the Concurrent Transformative Strategy in which quantitative and qualitative data are gathered at the same time and then prioritized and integrated into the design.

Quantitative data will include statistical and scientific data.

Qualitative data will be gathered from observation, survey, archival search, and direct interviews.

Plan for Documenting the Design Process

The design process will be documented digitally by means of scanning drawings and sequentially filing all digital files and folders. The process will be preserved and made available to future scholars through the Digital Commons of the NDSU Library system.

The interval for documentation will be weekly. At the conclusion of each week, all progress shall be scanned and/or organized digitally and backed up.

Previous Studio Experience

Second Year

Fall 2007
Professor Stephen Wischer
- Tea House: Fargo, ND
- Boathouse: Minneapolis, MN
- House for Twins: Fargo, ND

Spring 2008
Professor Mike Christenson
- Volume Exploration: Casa Gaspar, Spain
- Courtyard Community: Fargo, ND

Third Year

Fall 2008
Professor Cindy Urness
- Center for Excellence: Fargo, ND
- Lake Agassiz Regional Library: Moorhead, MN

Spring 2009
Professor Steve Martens
- Far North Museum: Fargo, ND
- Native American Community Center: Flandreau, SD

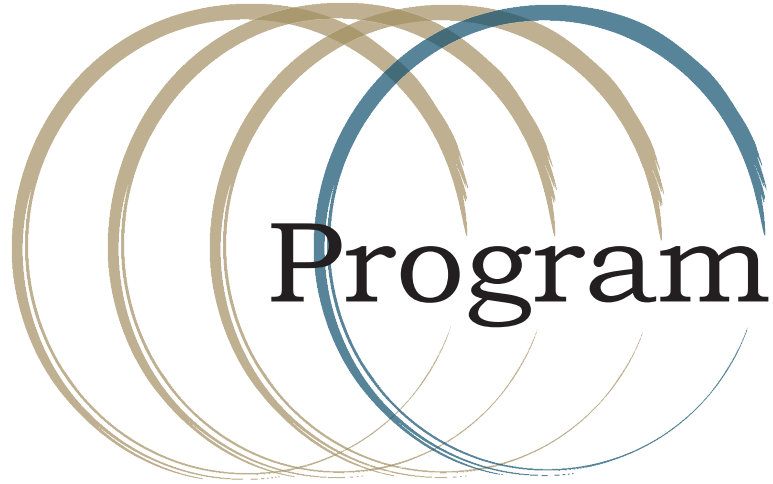
Fourth Year

Fall 2009
Professor Don Faulkner
- Highrise: San Francisco, CA
- KKE Musical Instrument Design Competition

Spring 2010
Professors D. Booker, P. Gleye, and F. Kratky
- Urban Design Studio: Santo Domingo, Dominican Republic
- Marvin Windows School Design Competition: Kigoma, Tanzania

Fifth Year

Fall 2010
Professor Mark Barnhouse
- Water Resource Experiment Station: Linton, ND



Program

Research Results & Goals

Theoretical Premise Research I.
Typological Research II.
Historical Context III.
Goals IV.

I. Results from the Theoretical Premise Research

"One of the main functions of architecture in high civilization has been to give significance to man's physical environment, either in terms of feeling through awe and the numinous (the sense of what is hallowed and sacred) or in terms of the human body and its manifold physical states—all of these being humane values of great importance and efficiency in the psychological, emotional, and physical life of man. As Geoffrey Scott has said, we transcribe ourselves into terms of architecture: also, we transcribe architecture into terms of ourselves. The whole of architecture is in fact unconsciously invested by us with human movement and human moods. This is the humanism of architecture" (Morris, 1956).

The experience of architecture and the built environment is complex, involving not only the physical body, but also the mind and emotions as we grasp for significance either consciously or subconsciously. Spaces can be interpreted differently by different people or even by the same person on a different day. What is significant is the lasting impression a space leaves with a person. That impression has influence over human well-being. This relationship between architecture and wellness can be explored in terms of sensitivity in design to the physical, mental, and emotional/spiritual components of human well-being.

Sensitivity to the environment (built and natural) radiates through humans to the very core of the well-being triad. Relating to the physical component of wellness, sensitivity applies to how patients physically react to pollutants in their surrounding built environment. This includes harmful air-borne bacteria and disease-causing organisms as well as chemical pollutants. The human body is a carefully

balanced organism that can be swayed from health quite easily in our present environmental conditions. The physical influence of the environment can be felt even in some of our involuntary bodily processes, such as breathing. For example, as a woman walks through the streets of Chicago, she may not think much about how or what type of air is being drawn into her lungs with every breath.

However, if that woman should venture into the Solar Decathlon House at the Chicago Center for Green Technology, she would begin to notice that drawing air into the body is suddenly a much more pleasant experience and that tensions around her lungs have started to relax. She would experience a physical reaction to the tectonics that compose the building.

Juhani Pallasmaa grasps this concept in his essay, An Architecture of the Seven Senses. He states, "A real architectural experience is not simply a series of retinal images; a building is encountered – it is approached, confronted, encountered, related to one's body, moved about, utilized as a condition for other things, etc." (Holl, Pallasmaa, & Perez-Gomez, 2006, p. 35). As physical experiences are realized by the mind, the meaning of sensitivity is translated in relation to the mental and spiritual components of wellness.

Steven Holl breaks down perception into the physical (outer) and mental (inner) perceptions. The physical perception manifests as phenomenology, or the experience of place, while the mental perception focuses on the intentionality and meaning of space. He continues, "The challenge for architecture is to stimulate both inner and outer perception; to heighten phenomenal experience while simultaneously expressing meaning; and to develop this duality in response to the particularities of site and circumstance" (Holl et al., 2006, p. 42). The lines between mental and physical perception may be distinct, but they are also inseparable and intrinsically bound to natural context.

Termed biophilic design, architecture that addresses "humans' inherent inclination to affiliate with nature, most particularly with life and ecosystem features of the natural environment" (Guenther & Vittori, 2008, p. 85) also fosters "a positive connection between people and nature in places of cultural and ecological significance." The positive correlation between wellness and a connection to nature is itself significant, but even more so is the qualifier that this relationship is enhanced by a significant sense of place. In their essay, Nature and Healing: The Science, Theory, and Promise of Biophilic Design, Kellert and Heerwagen note that "not all nature is equally beneficial. Spaces with large trees, water features, birds, and a variety of shrubs and flowers are perceived more positively than spaces with only grass" (Guenther & Vittori, 2008, p. 85).

Considering again the concept of sensitivity, it is not surprising that a natural environment that contains more stimuli than a flat plane of grass should have a more positive effect on well being. Nature has the capacity to engage all of our physical senses effortlessly while establishing a relationship with our mind and spirit that fosters an understanding of our surroundings. It is the perfect example of Stephen Holl's "challenge for architecture," mentioned earlier, except that the natural environment, although influenced by, is not usually constructed by humans. This idea spurred Ulrich's research, which first began in 1984 (as cited in Guenther & Vittori, 2008). "Ulrich tested the effect of window views on patient outcomes" (p. 86), according to Kellert and Heerwagen's essay. What is most interesting in his experiment is that all patients participating did have a window in their rooms. The view was either a brick wall or a landscape with trees, but the access to natural light was still present. It is not known if patients had access to fresh air through operable windows. We do know that "the two view groups were matched for age, gender, and general health conditions; all patients had the same kind of surgery" (Kellert & Heerwagen in Guenther & Vittori, 2008, p. 86).

According to Ulrich's findings, patients with the views to nature needed less pain medication, had shorter hospital stays, and experienced a "more positive postsurgical recovery overall than did the patients who had the view of the brick wall" (Kellert & Heerwagen in Guenther & Vittori, 2008, p. 86). While Ulrich's research is a huge validation for natural views, it only studied the healing effect related to one of the human senses: sight. If the stimulation of one sense can have a pronounced healing effect, it isn't hard to imagine what positive things could happen if all the senses were engaged in positive ways through the natural environment. Kellert and Heerwagen look at this idea in a larger context as it relates to the sustainable/green design movement. They acknowledge that the current focuses on energy usage, avoidance of toxic products, resource management, etc. are important, but the efforts are not adequate to actually foster a positive engagement of human well being. "In other words, biophilia is a missing link in current attempts at sustainable design. Our challenge is to restore in the built environment all of our inherent biophilic values of nature. Only by harmonizing the natural and built environments in an increasingly urban world can we arrest the ominous trends of environmental destruction and alienation from nature so pervasive in modern life" (Kellert & Heerwagen in Guenther & Vittori, 2008, p. 88).

Biophilic design is an important concept to speak of in general terms, but it can be difficult to pin down how to directly apply it in terms of architecture. Kellert and Heerwagen offer a method of application through direct, indirect, and symbolic interactions with nature. They list six categories that biophilic design elements can be drawn from: environmental features, natural shapes and forms, natural patterns and processes, light and space, place-based relationships, and evolved human relations to nature. The following figure gives a more in-depth look at what those categories include. The list is not, by the authors' admission, necessarily complete, but it does provide a good overview of ways biophilic elements can be incorporated into design.

1. Environmental features:
   - Natural materials
   - Natural colors
   - Sunlight
   - Water
   - Natural ventilation
   - Plants and animals
   - Natural views and vistas
   - Facade greening
   - Geological and landscape forms
   - Habitats and ecosystems
   - Fire

2. Natural shapes and forms:
   - Botanical motifs
   - Animal motifs
   - Shell and spiral forms
   - Egg, ovular, and tubular forms
   - Arches, vaults, domes
   - Columns and treelike supports
   - Shapes that resist right angles
   - Simulation of natural features
   - Biomorphism (resemblance to organic forms)
   - Natural morphology (e.g., stratified surfaces and rooted relationships)
   - Biomimicry (mimicry of organic structures and functions)

3. Natural patterns and processes:
   - Sensory variability
   - Information richness
   - Time, aging, and change
   - Growth and efflorescence
   - Central focal point
   - Patterned whole
   - Bounded spaces (e.g., borders, territories)
   - Transitional spaces (e.g., gateways, thresholds)
   - Complementary contrasts (e.g., light/dark, high/low)
   - Dynamic balance and tension
   - Similar forms at different scales (e.g., fractals)
   - Hierarchically organized scales
   - Ordered complexity
   - Relation and integration of parts to whole
   - Linked series and chains

4. Light and space:
   - Natural light
   - Filtered and diffused light
   - Light and shadow
   - Reflected light
   - Light pools
   - Warm light
   - Light as shape and form
   - Spatial variability
   - Spaciousness
   - Space as shape and form
   - Spatial harmony (the integration of light, mass, and scale)
   - Inside/outside spaces (e.g., atria, colonnades)

5. Place-based relationships:
   - Historical connection to place
   - Cultural connection to place
   - Geographical connection to place
   - Ecological connection to place
   - Use of indigenous materials
   - Compatible orientation to landscape
   - Landscape features that define building form
   - Landscape ecology (connections, corridors, biodiversity)
   - Integrating culture and ecology
   - Sense or spirit of place
   - Avoiding placelessness

6. Evolved human relations to nature:
   - Prospect and refuge
   - Exploration and discovery
   - Mystery and enticement
   - Order and complexity
   - Change and metamorphosis
   - Information and cognition
   - Attraction and beauty
   - Mastery and control
   - Security and protection
   - Affection and attachment
   - Fear and awe
   - Reverence and spirituality

(Guenther & Vittori, 2008, p. 89)

Most of the points listed refer back to the fundamentals of architectural education. For example, the entire category of natural patterns and processes is based around an understanding of basic spatial relationships. It is no coincidence that our understanding of space is best introduced intellectually through naturally occurring patterns. The category that seems to over-arch all the others is that of evolved human relations to nature. It is a compilation of mental impressions that can be translated from physical experiences, which are in turn induced by the elements in the five other categories.

These mental impressions are often felt on the subconscious level more than having an actual defined awareness of them. Alain de Botton, in The Architecture of Happiness, relates that this subconscious thought life is what makes being a sensitive architect difficult, and that in many cases "architects have failed to convert an unconscious grasp of their own needs into reliable instructions for satisfying the needs of others" (de Botton, 2006, p. 247). Often, we enter a well designed space and cannot form a reason for its "well-building" (Scott, 1914). However, it seems that whatever the emotion we are intended to feel in a place (happiness, peace, etc) it is always intended for a designed space to embody a sense of beauty. Relating to the unconscious again, "The places we call beautiful are… the work of those rare architects with the humility to interrogate themselves adequately about their desires and the tenacity to translate their fleeting apprehensions of joy into logical plans – a combination that enables them to create environments that satisfy needs we never consciously knew we even had" (de Botton, 2006, p. 249). From this understanding of beauty in architecture, interpretations can begin to form about how the built environment can influence mental and spiritual well-being.

De Botton makes the profound observation that "It is perhaps when our lives are at their most problematic that we are likely to be most receptive to beautiful things. Our downhearted moments provide architecture and art with their best openings, for it is at such times that our hunger for their ideal qualities will be at its height" (de Botton, 2006, p. 150). Of course, the juxtaposition of this concept is that the ideal is rarely, if ever, obtained, and so in these "downhearted moments," being surrounded by beauty can be, at the same time, profoundly soothing and a painfully striking reminder of what cannot be.

Although the source of beauty in architecture is at times ambiguous, buildings also speak to us in more general terms. As de Botton states, "Insofar as buildings speak to us, they also do so through quotation – that is, by referring to, and triggering memories of, the contexts in which we have previously seen them, their counterparts or their models. They communicate by prompting associations" (de Botton, 2006, p. 93). This is the essence of the translation from the physical senses to the mental realizations of the experience of a space. As finite human beings, our minds work in comparison. When faced with a new architectural experience, we automatically attempt to draw parallels with past experiences. If we are unable to find similarities, we might then try to find differences, or even opposites, in an attempt to identify what we are feeling. The concern with this approach to new experiences is that we are never able to view something and have it leave a mark on a blank canvas, so to speak. According to Geoffrey Scott (1914), "everything which recalls a period of the past may recall, by association, the emotions with which that period is, at the time, poetically regarded." Depending on personal experiences, this historical context can result in positive or negative connotations for the space as experienced by the individual.

Attempting to identify reactions to spaces points to a "belief in the significance of architecture" (de Botton, 2006, p. 13). This belief "is premised on the notion that we are, for better or for worse, different people in different places – and on the conviction that it is architecture's task to render vivid to us who we might ideally be" (de Botton, 2006, p. 13). This is an enormous task for any one person or thing to accomplish. And yet, that is what so many people unconsciously seek in architecture: a revelation of who they are at their very core. Seeking this revelation can be a dangerous, though, as "there will be times when the most congenial of locations will be unable to dislodge our sadness or misanthropy" (de Botton, 2006, p. 17). Human emotions are powerful, and at times, they are unable to be shaken, no matter how beautiful the surroundings, whether in the natural or built environments. And yet, in the midst of grief, pain, sadness, etc, our minds can still be touched and a positive memory association can be created. "It is in dialogue with pain that many beautiful things acquire their value" (de Botton, 2006, p. 25). In the same way that places can obtain a negative association from bad experiences, the comfort that beauty offers in pain can become a life preserver supporting one in uncharted waters.

When evaluating how the built environment can positively influence human well-being, it is important to keep the physical, mental, and emotional/spiritual components of the human experience in context. These components are nearly inseparable, and so must be treated in totality. Creating a building that is sensitive to the human experience will entail a focused look at both the site and cultural context that it will interact with.

Results from the Theoretical Premise Research: Summary

The research for the theoretical premise focused on the idea of how design is sensitive to the relationship between humans and the built environment as it refers to well-being. This realationship was explored at several levels, including the physical, mental, and emotional/spiritual components of wellness.

The first realization through research was that it is very difficult to separate physical and mental perceptions of a space from one another. Our bodies' sensory perceptions are immediately transferred to our brains for interpretation. However, the physical interaction with a space can be defined as that intial perception before our minds have a chance to draw on past connections for interpretation. The physical connection was explored as being more than just a visual picture of space, but a full sensory experience. This experience can be enhanced through the incorporation of natural elements known as biophilic design. Scientific studies have shown that visual connections to nature have a positive effect on the healing of patients. It can be postulated from this that engaging more of the senses in connection to nature will also have a positive effect on patients. There are many different ways that biophilic elements can be incorporated into building design in order to enhance the built environment for the general public, not necessarily just medical patients.

The mental interpretations of the built environment have just as much importance for well-being as the physical responses. Part of the difficulty in designing spaces to be received well mentally is that many human spatial needs are only realized on the subconscious level. An over-arching desire for beauty occurs in almost all designed spaces. Our sense of beauty comes from those unconscious needs being met, and so the idea of beauty remains somewhat ambiguous. There is also concern for the built response to human emotions, in particular for those related to sadness. There are some points of life when even a beautifully designed space cannot shake sadness away from a person. Architecture can offer its influence, but it does not have the ability to force its intentional experience upon someone so shrouded in emotion. There are limits, but the offer of beauty can always stand.

The research affirmed the theoretical premise that the built environment has the potential to positively influence the well-being of the people who interact with it. This happens in the physical sense, as the scientific research by Ulrich (Guenther & Vittori, 2008) has shown, but it also occurs on a much deeper level that can touch the very soul of a person. and shape their interactions with the built environment in a lasting way.

II. Results from the Typological Research

(All images from Hudson, 2008)

ONE

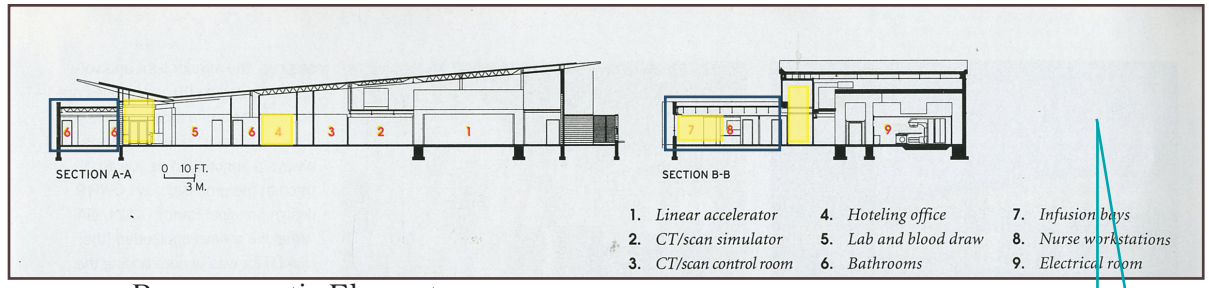
UW Cancer Center

Johnson Creek, Wisconsin
14,300 Square feet

Designed by OWP/P, this facility is located in a rural setting where patients would otherwise need to travel long distances to receive treatment. The design of the facility allows natural light in the building and visual connections to nature. The main path to achieving these elements was the design of the roof, an assymetrical butterfly structure that allows clerestory windows (Hudson, 2008).

The simple, natural material and color pallet allow the play of light and shadow to enhance the spatial beauty of this building. Even the steel structural system, so often perceived as "cold," aids in the perception of space by offering a rhythmic interruption to the wooden ceiling boards. These same steel members make a visual connection from the exterior of the building as they give a clue to the nature of the interior space.

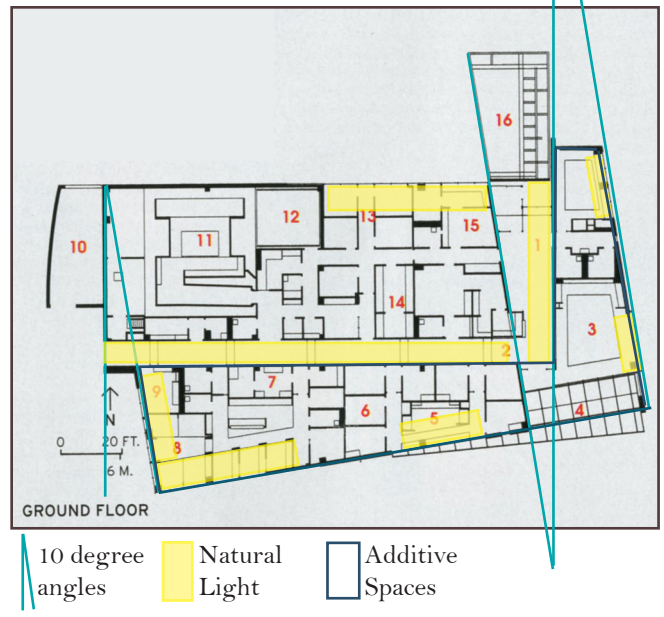
This facility gives a new experience to traditional cancer treatments. The architects made sure that patients have access to natural light and views wherever possible, which according to Ulrich's research (Guenther & Vittori, 2008), can have substantial impact on healing and recovery. The building also features some operable windows, most notably in the chemotherapy infusion bays. In fact, according to the project manager, "'People actually take their treatments outside--the building allows for that'" (Guenther & Vittori, 2008, p. 8).



Programmatic Elements

Entry 1	Lounge 9
Reception 2	Mechanical 10
Waiting Area 3	Linear Accelerator 11
Terrace 4	CT/scan Simulator 12
Team Work Area 5	Office 13
Exam Rooms 6	Treatment Planning 14
Medication Rooms 7	Lab 15
Infusion Bays 8	Conference Room 16

The building is fairly simple in form, with just two additive elements: the conference room, which also acts as a signal for entry, and the main patient-accessed areas. Patient areas fan out from the east-west axis at a 10 degree angle, creating dynamic spaces for chemotherapy infusion and waiting areas. Also included in this area is a staff-oriented team work area, which takes advantage of the southern light. Heirarchy in form was given first to the entry corridor, and then, for functional reasons, to the linear accelerator, which must be enclosed in a thick concrete vault.



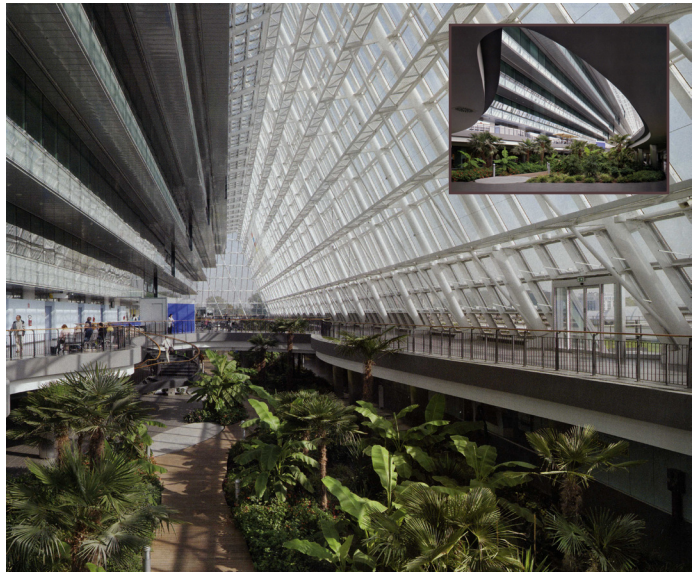
Relationships between plan and section are not exact. The angle of the long roof plane is less than 10 degrees, while the angle of the short roof plane is greater than 10 degrees. The only areas which actually experience the sloped roof are the entry and waiting areas.

This facility is an important case for cancer treatments in rural settings as it demonstrates how the relationship between light and space can enhance and foster a positive healing environment.

TWO Ospedale dell'Angelo

Venice, Italy
1,265,000 Square feet

Designed by Emilio Ambasz & Associates, this hospital places focus on connection to nature. Located in a park in Venice, the entry into the hospital is from under the slight hill that it sits upon. From the entry lobby, an awe-inspiring view is obtained of the monumental atrium space, which was the design focus for the facility. This space creates a more holistic connection to nature than just the typical view from a window. Patients and visitors alike are able to experience the southern light falling on the tropical plants and breath the slightly fragrant, well-oxygenated air. About half of the patient rooms look over this atrium, which also acts as a social area, while the other half look out on planted balconies (Deitz, 2009).

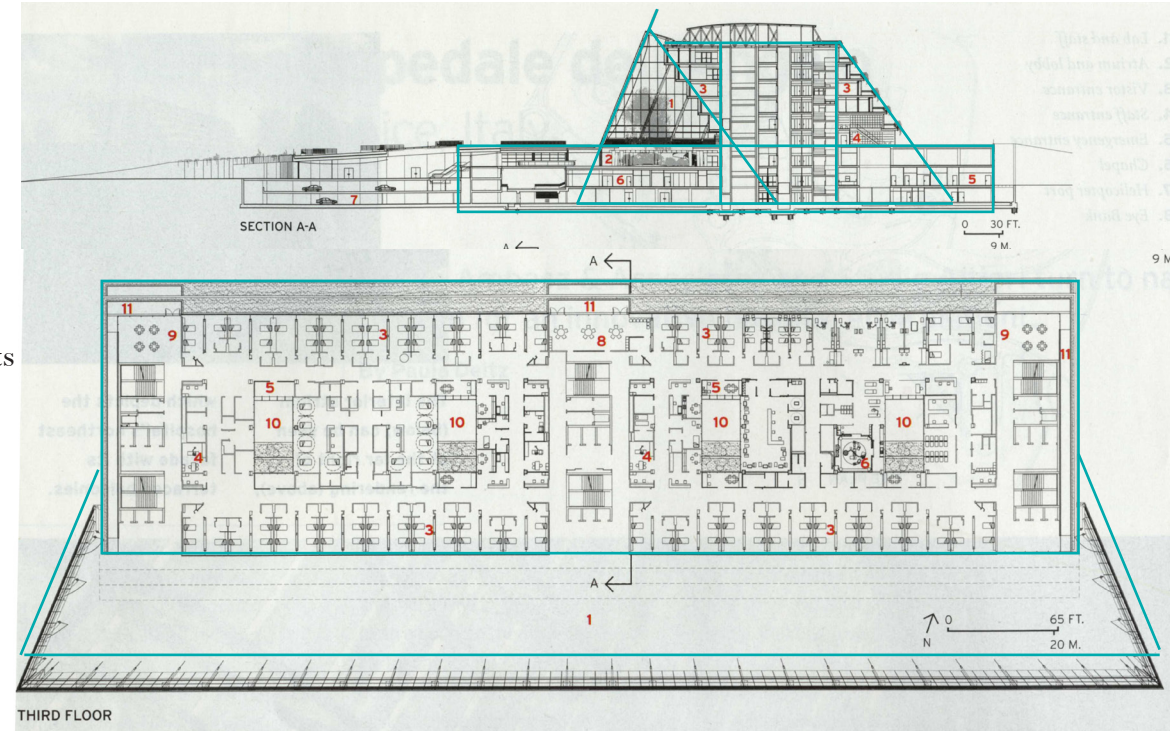


The glass façade of the atrium "is composed of 11,000 trapezoidal panes of different dimensions, held in aluminum frames over a gridded steel structure" (Deitz, 2009, p. 77). As can be seen to the right, the two ends of the curtain wall are delta trusses. Steel bar joists run horizontally along the plane, while steel tubes extend vertically past the upper edge of the building.

On the southwest entrance facade, a steel-and-glass curtain wall covers the atrium (below). On the remaining facades, stepped terraces with plantings adjoin patient rooms.

Spatial navigation within this hospital is very straightforward. As mentioned, patient rooms line the north and south exterior walls.

The core of the building houses the operating and treatment rooms. Two corridors run in the east-west direction, and there are several north-south connecting corridors for more efficient movement through the facility.



Programmatic Elements
1. Atrium
2. Visitors' Lobby
3. Patient Rooms
4. Doctors' Offices
5. Health-care Staff
6. Operating Rooms
7. Staff Parking
8. Lounge
9. Family Lounge
10. Small Atrium
11. Terrace

Patient rooms line most of the exterior and atrium walls, giving all patients access to natural light. Even the interior core functions flank smaller courtyards, allowing light into the interior spaces.

The hospital extensively explores additive and subtractive relationships in form. In plan, the additive nature is straight-forward. An unfinished triangle is added to a rectangle. However, in section, the relationship becomes much more complex. Now, the unfinished triangle is still added to the rectangle, but the triangle itself has been subtracted from on the northern side with the inclusion of planted balconies.

Also of note are the overlapping geometries in section. The main shape is the suggested triangle, but layered on that is the parallelogram, the rectangle, and even another triangle. The intersections of the smaller triangle of the atrium and the vertical rectangle form yet two more triangles with equal proportions.

The building as a whole gives a positive experience to patients in the plentiful connections to nature. However, with all of the planning that went into those connections, the actual patient rooms, when viewed without those visual cues, appear quite bland. The interior finishes are very impersonal. With so much detail in the public spaces, more is to be expected for the individual spaces.

THREE

D'Amour Center for Cancer Care

Springfield, Massachusetts
64,000 Square feet

Designed by Steffian Bradley Architects, this facility adds a cancer-specific treatment center to the Baystate Health System. The design was centered around the patients' experience with the intent of relieving stress rather than adding stress to treatments. The architects sought to address this through separating support spaces from all patient accessible areas and also by utilizing natural light in circulation spaces. The main circulation spine also doubles as patient waiting areas, so experience in these spaces became even more important. In addition, the interior design focused on the natural look and feel of materials (Architectural Record, 2005). Materials were also selected based on their green qualities so as not to compromise patient health any further (Guenther & Vittori, 2008).

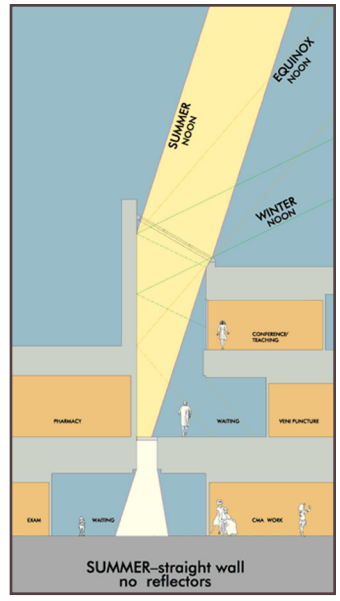
As can be seen in the plans, the majority of the building is rectilinear in form. It is interrupted by the curved corridor, which, as previously mentioned, includes some patient waiting areas. This curved corridor extends all the way through both the west and east ends of the building. On the west end, the corridor meets the entry condition, which is itself a curved curtain wall of glass. The entry is accentuated by exterior steel columns supporting a two story canopy that hugs the curve of the curtain wall. Above the entry doors is a horizontally curved canopy that extends from the same line of the curved corridor. The structural details of the entry give a visual indication of the steel structure within the building, most of which is enclosed in finishes. On the main level, the corridor only extends eastward about three quarters of the width of the building. On the second level, above the entry on the west end, the corridor gives way to the café. On the eastern end, the corridor punctures through the façade with an enclosed lounge area. All of the patient-oriented areas of the facility are accessed by travel through this central corridor, so it is appropriately detailed as it sees the highest volume of traffic. The concept of the traditional waiting area was challenged by the design team for this building, and their success is evident. The waiting areas become much more comfortable and informal gathering spaces, rather than the usual bland and stiff, pins and needles areas.

(All images from Architectural Record, 2005)

Staff Offices | Staff Support | Patient Treatment | Patient Non-treatment

Programmatic Elements

1. Lobby
2. Resource
3. Waiting
4. Treatment Planning
5. Exam Rooms
6. Offices
7. Linear Accelerator
8. Café
9. Social Services
10. Chemotherapy
11. Pediatric Suite
12. Pharmacy/Lab
13. Conference Room
14. Lounge
15. Records/Business
16. Mechanical/Utility



The building's form addresses the relationship between both additive and subtractive components. To the whole geometry, the entry condition is additive. It not only breaks the rectilinear mold, it also extends beyond the façade edge to create a sense of hierarchy in the entry. On the north side of the building, the second level is subtractive, as it ends as the radiation spaces begin on the first level.

One of the main concerns of the architects was to separate the patient and staff building functions. On the main level, this was achieved without compromising the working environment for staff. On the second level, however, there are large blocks of staff support areas that are well-integrated into both the treatment and exam areas. While many of these areas remain "unseen" by patients, it does raise the question of whether the staff has a quality working environment in these enclosed areas, especially when so much detail has gone into other areas such as the central corridor. Overall, this project is very inward-focused, to the exclusion of all other connections to nature other than light.

Results from the Typological Research: Summary

This particular series of case studies covered a large range of both building size and scope of treatments. From the UW Cancer Center at Johnson Creek, a facility meant to serve a small, rural population, to the medium sized cancer treatment center of D'Amour in Springfield, Massachusetts, to the large Ospedale dell'Angelo in the urban context of Venice, Italy, it has been shown that sensitivity in design does not depend on the scale of the facility. The theoretical premise, that the built environment has the potential to positively influence the well-being of the people who interact with it, has been affirmed through these case studies. In fact, in the case of D'Amour, the facility has drawn "more philanthropic support than any project in the Baystate system" (Guenther & Vittori, 2008).

All of these facilities have been designed with the patient in the forefront of the designer's mind. In some cases, attention to patients has eclipsed the attention that should also be given to the medical staff, who work in these facilities on a daily basis. As much as the design should enhance the healing process for patients, it should not be detrimental to the health of other building users; it should also enhance employees' daily experiences.

The designers for these facilities have all provided views of nature for patients. In Venice, this idea was taken a step further to include a large planted atrium in the building. This concept is affirmed by Ulrich's research (Guenther & Vittori, 2008) as effective for enhancing recovery and healing. However, each case study has its drawbacks in its chosen approach to this idea, whether a lack of non-visual connections to nature, or bland patient rooms, or even lack of full views to nature.

All of the designs incorporated some type of central circulation corridor. At UW Johnson Creek, this corridor was used to separate patient and employee building functions. In At D'Amour, the corridor was paired with waiting areas and it separated counseling and exam functions from treatment functions. In Italy, the corridors were for the circulation of all building users.

The facilities all employed additive strategies in form, but in very different ways. From a simple curvilinear form added to a rectilinear form to a triangle added to a rectangle and then layered upon, the approaches in this area are seemingly endless. The relation from plan to section in these instances was quite vague for all of the studies, but still present in some form.

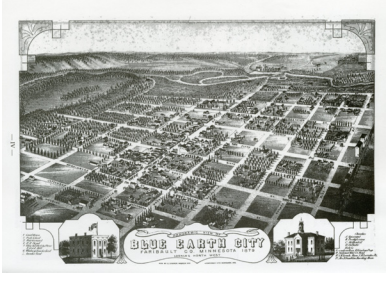
In terms of site, the two smaller case studies seemed to sit on the landscape while the large hospital took advantage of the rolling hills in the park of its location to use earth-integration for parking and some hospital operations. In terms of site planning, UW Johnson Creek was the most aware of its context, according to Guenther and Vittori (2008), as it disturbed as little of the natural site as possible. These two buildings take advantage of the surrounding views. At D'Amour treatment center, the views to nature are not as available, and so the building turns inward to itself and relies on natural light for a connection to nature.

While these case studies have affirmed the theoretical premise, they have also been eye-opening to some of the spatial and personal issues that need to be dealt with in cancer treatment and care. One of the main topics for further study is the relationship of public to private and the need for support versus the need for solitude.

III. Results from Historical Context Research

History of Blue Earth, Minnesota

Moses Sailor was the first official settler in Faribault County in 1855. He built a log cabin along the west fork of the Blue Earth River. Following him the next year was James B. Wakefield, along with several others. Their task was to organize the county and plant a town, which became Blue Earth. Wakefield was 28 years old at the time and ended up living out his life as a prominent citizen of Blue Earth. Together, these men chose the site for the town and county seat to be situated between the two branches of the Blue Earth River, and together, they forged a strong community on the plains of southern Minnesota (Citizens, 2005).

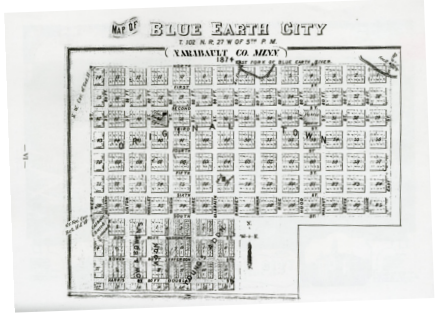


The early settlers had the sense to build a hotel early in the town's life to be able to house arriving settlers. The hotel was operated by the Constans family and was in operation until it was torn down in 1988 after a very long decline in business. The hotel occupied the southwest corner of the intersection of Main and 5th Streets. Originally a log building, it was replaced with a wood frame building in 1875, which was eventually clad in brick. Toward the end of the hotel's life, the building was split up so as to be rented out in an effort to keep it afloat (Citizens, 2005).

Another prominent building in Blue Earth's history is the courthouse. Courthouse Square occupies the entire block between 2nd and 3rd Streets bordering Main Street. The first courthouse was built in 1872 and was later replaced in 1891 with the building that still stands there today. The county recorder's office still houses original documents from over 100 years ago, although those records have been joined by modern day digital collections now (Citizens, 2005).

History of Blue Earth, Minnesota

Main Street has undergone several changes over time, but some of the original buildings are still intact, and even some of the original businesses are still alive in some form or another. First National Bank is one of those enduring businesses that has undergone several name changes over time, but can still be traced back to the original City Bank of Chadbourn Brothers. The bank still sits south of 7th Street on Main Street, and marks the southern end of the general business district. One of the banks that merged into First National used to occupy 113 North Main Street, which is the present-day home to Blue Earth Graphics (Citizens, 2005).



Main Street has always been a wide street to accommodate the large traffic flow and street parking. The town has seen the entire evolution of the automobile and has adapted over time accordingly. Today, Main Street is lined with parallel parking spots on both sides and still maintains more than enough room for two lane, two-way traffic. The Syndicate Block, on the northeast corner of 7th and Main Streets is the largest building on the east side of Main Street (Citizens, 2005). It still stands today, although notices hang on all three of the shop doors informing the public that the sole occupant was evicted in 2009.

The Converse Opera House, which became the Sandon Theater, and eventually became the American Legion, is located on 6th Street, just west of Main Street. Both the opera house and the movie theater included artistic cultural elements. The opera house was damaged beyond repair by a tornado in 1936, and was rebuilt as the Sandon movie theater. Upon rebuilding, murals of an agricultural theme were painted on the ceilings. The murals are rumored to still be there, but are covered by the suspended ceiling system the American Legion installed (Citizens, 2005).

History of Blue Earth, Minnesota

On the southeast corner of 5th and Main Streets sat The Sweet Shop, a store which sold ice cream. It was frequented by many in the town, most notably the younger citizens. A family by the name of Schwen owned the shop, and the ice cream was so popular that they needed to expand. In 1929, they built the ice cream factory that was located on the southwest corner of 4th and Main Streets. The ice cream was distributed in southern Minnesota and northern Iowa from the 1940s through the 1960s. In the early 1970s, the business went under, and the factory building was demolished. The building was replaced with townhouses, which still occupy the site today (Citizens, 2005).

The first hospitals in Blue Earth were operated out of houses. The first one came into being in 1905 under Dr. Schmitt. In 1910, a twelve-bed hospital was built at 209 West 6th Street. Dr. Wilson had control of the hospital for about 40 years. The ground breaking for the hospital at 11th and Galbraith Streets occurred in 1949. It was a 20-bed facility when it opened (Citizens, 2005). This hospital has been expanded several times over the past 60 years, with a renovation just finished in the fall of 2010. The facility now occupies its entire block and is completely hemmed in by residential housing on all four sides. It is currently operated by the United Hospital District, which serves the surrounding area.

History of Blue Earth, Minnesota

The history of churches in Blue Earth is quite extensive, and since the Christian faith is an important part of the town's culture, the churches and their founding dates are listed here:

First United Methodist Church 1856
First Presbyterian Church 1859
Immanuel Evangelical Church 1860
St. Peter and Paul Catholic Church 1866
Church of the Good Shepherd, Episcopal 1867
Immanuel Lutheran Church 1868
Salem Evangelical and United Brethren Church 1881
St. Paul Lutheran Church 1887
Trinity Lutheran Church 1891
First Baptist Church 1891
Assembly of God River of Life Worship Center 1934
Faith Lutheran Brethren Church 1958
Cornerstone Evangelical Free Church 1995

(Citizens, 2005)

Many of these churches were started by groups of settlers of the same ethnic group who immigrated around the same time period. The buildings that each congregation has built in the town and surrounding areas have enriched the architecture of the area, as no two churches are alike.

History of Cancer

1761: Giovanni Morgagni began performing autopsies as a method for studying the effects of illness on the body.

~1780: John Hunter postulated that some cancers could be cured by removal through surgery. He claimed that if the tumor had not invaded nearby tissue, it could be operated upon.

~1880: Development of anesthesia, allowing surgeries to become more widely performed.

The 19th Century led to the birth of scientific oncology with the development of the microscope. Rudolf Virchow, the founder of cellular pathaology, laid the foundation for a more in-depth study of cancer. Body tissues removed through surgery could be analyzed for a more accurate diagnosis (American Cancer Society, 2010).

Historical theories on cancer range from the humoral theory of Hippocrates, which is based on body fluids, to the parasite theory of the 17th and 18th centuries, which claimed cancer was contagious. Other theories included the Blastema theory, which correctly identified cancer as cellular, but thought the cells came from non-cellular matter, and the Trauma theory, which proposed trauma as cancer causing, even though no study ever confirmed the theory (American Cancer Society, 2010).

Today, it is known that cancer is caused by carcinogens that produce genetic mutations in cells. The cancerous damaged cells continue to reproduce and grow. The cells may be contained in a tumor, or they may spread into other areas of the body (American Cancer Society, 2010).

Cancer Treatments

Surgery

It wasn't until the late 20th Century that surgeons developed enough skill and technology to have a higher rate of success with surgery as a form of cancer treatment. Techniques were developed for taking smaller portions of body tissue out during surgery, as in a lump versus an entire breast. Today, technology is still evolving and trending toward even less invasive surgery techniques such as endoscopic, laparoscopic, and thorascopic surgeries (American Cancer Society, 2010).

Hormone Therapy

It has been discovered that estrogen in women and testosterone in men stimulate breast and prostate cancers respectively. In response to this discovery, drugs were developed that blocked the production of these hormones. Currently, the drugs are used to treat both types of cancer, and used to help prevent breast cancer (American Cancer Society, 2010).

Radiation

Radiation treatment for cancers was developed around 1900. Shortly after the treatment was found to be effective, it was also discovered that radiation was also a cause of cancer. With advances in technology, radiation treatments have become much more safe than they were at the outset. Treatments are available that cause little damage to nearby normal tissues (American Cancer Society, 2010).

Chemotherapy

This set of cancer-fighting drugs was intially developed during WWII. The drugs work by killing rapidly growing cancer cells and blocking cell functions involved in growth and replication (American Cancer Society, 2010).

IV. Goals

Academic

I seek to leave behind a thesis that can be utilized by future students as research material. This means having thorough and complete research and documentation of the design process, as well as a developed and sensitive final product. In addition to helping others with future research, I also strive to have a culminating project that I can look back upon with delight.

I look to this design opportunity as a spring point for the future. In as much as the formal portion of education is coming to an end, I hope that this project teaches me ways to continue to learn by doing in the future.

Professional

It is my goal that this thesis acts as an agent of change. As I enter the professional world, I do not want to be merely quoting the work of others, but rather interpreting ideas with merit into driving forces for application in the present and future. I hope to bring the quality of responsive, sensitive, people-based architecture to where ever I end up professionally.

Personal

As I have watched several family members battle cancer, one of the consistent underlying observations has been the avoidance of talking about the place of treatment. Most cancer patients are used to being asked how they are doing, and how their treatments are going, but rarely is the actual place of treatment discussed. A place of treatment should not have to be viewed as an oppressive building where one can never experience comfort or peace. It is my goal with this thesis to break the mold of silence and create a sensitive and responsive treatment center that caters to the physical, emotional, and spiritual aspects of human wellness. As part of this goal, I seek to understand to a greater extent how our surroundings are translated from physical senses into a mental and spiritual understanding.

As I enter this final chapter of my formal education at NDSU, I hope that I will continue to grow as a designer in this process. From spatial volume, to building systems, to finishes, to material joints, I want to more fully understand how a building can interact with the people who inhabit it. After all, architecture is by the people, for the people, and, as Juhani Pallasmaa insinuates, speaks of the human condition (lecture, December 6, 2010).

Site Analysis

Qualitative I.
Quantitative II.

I. Qualitative Analysis

General Character of Downtown Blue Earth

Blue Earth's downtown area is typically approached from the north, east, or west directions, and each approach has its own character. When approaching from the north, whether driving or walking southward on Main Street, the downtown seems rather nondescript and not entirely worth taking notice of until you reach the area just south of 5th Street, where the density of the buildings bordering Main Street increases. Before that area, there is an anticipation of what is to come, and that sense can result in being blinded to what is passing.

Approaching from the south, driving or walking northward on Main Street, there is a very quick transition from residential housing to the downtown general business district, mainly marked by the bank with its large parking lot directly off Main Street. Very quickly, the hub of downtown is reached: Juba's Supervalue, the only "large scale" grocery store in town.

Coming into town from the east, driving or walking westward on 7th Street, several different building types are encountered before downtown is reached. Just west of U.S. Highway 169 are some of the more light industrial buildings of the town. West of that area are more residential single family homes. At the western edge of the homes, some small businesses and several churches signal the approach to Main Street and the general business district.

The cross streets extend westward past Main Street, however, the town is entirely residential on that side, so there is significantly less traffic both going and coming from that area.

Northwest Corner of Main and 5th Streets

The site itself is about as blank as an open lot in a downtown area can be. The site lies within the larger Jeffersonian grid of the town and is bordered by streets to the east and south. To the north, the boundary is the rectilinear, one level tall building edge of Southern Jack's Bar & Grill, and to the west lies the old VFW parking lot and the single level STEP employment building.

The main texture during the spring/summer/fall months on site is a moderately short and somewhat spiky lawn grass, which is intermixed with common yard weeds. In the winter months, the site is mostly covered in snow, which would normally be an unbroken sheet of glittery white.

The quality of light on the site changes with the season. Summer light is quite intense and warm, especially due to the lack of shadows on the site. In the winter, which is generally more cloudy, the light is more muted and has a cool quality.

The arrangement and low heights of buildings downtown and the very wide streets let the wind keep its natural course through the area. On this specific corner, there is full exposure to southern and western winds, but northerly winds are partially shielded by Southern Jack's Bar & Grill.

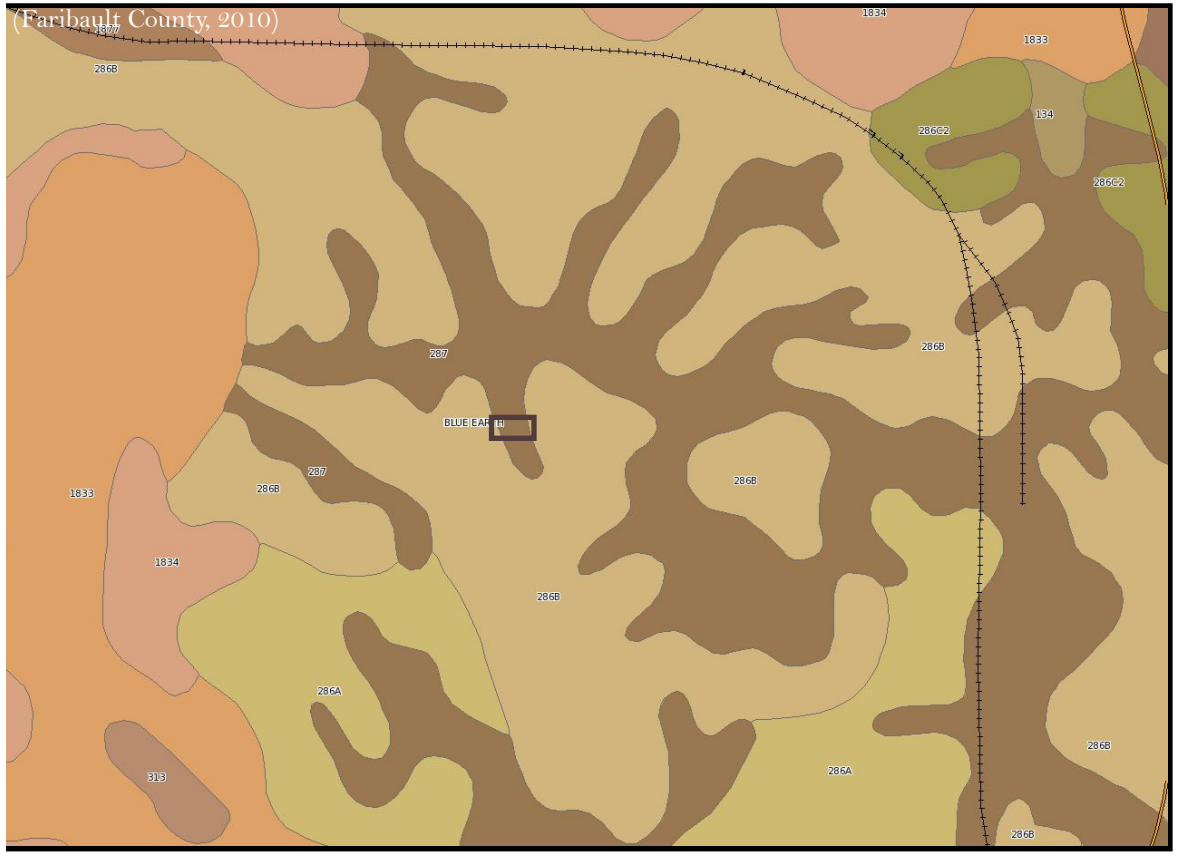
Human intervention on site is of a more historical nature on the macro scale as it concerns the construction and demolition of buildings. On the micro scale, the site is currently used as storage for an enclosed trailer and occasional vehicle parking.

Distress around the site is signaled by the presence of some empty retail spaces along Main Street.

II. Quantitative Analysis

Site Dimensions

Soils


(Faribault County, 2010)
1834
1833
286B
134
286C2
286C2
287
286B
BLUE EARTH
287
1833
286B
286B
1834
286B
286A
286B
313
286A
286B
N
Blue Earth mucky silty clay loam
Shorewood silty clay loam
Site

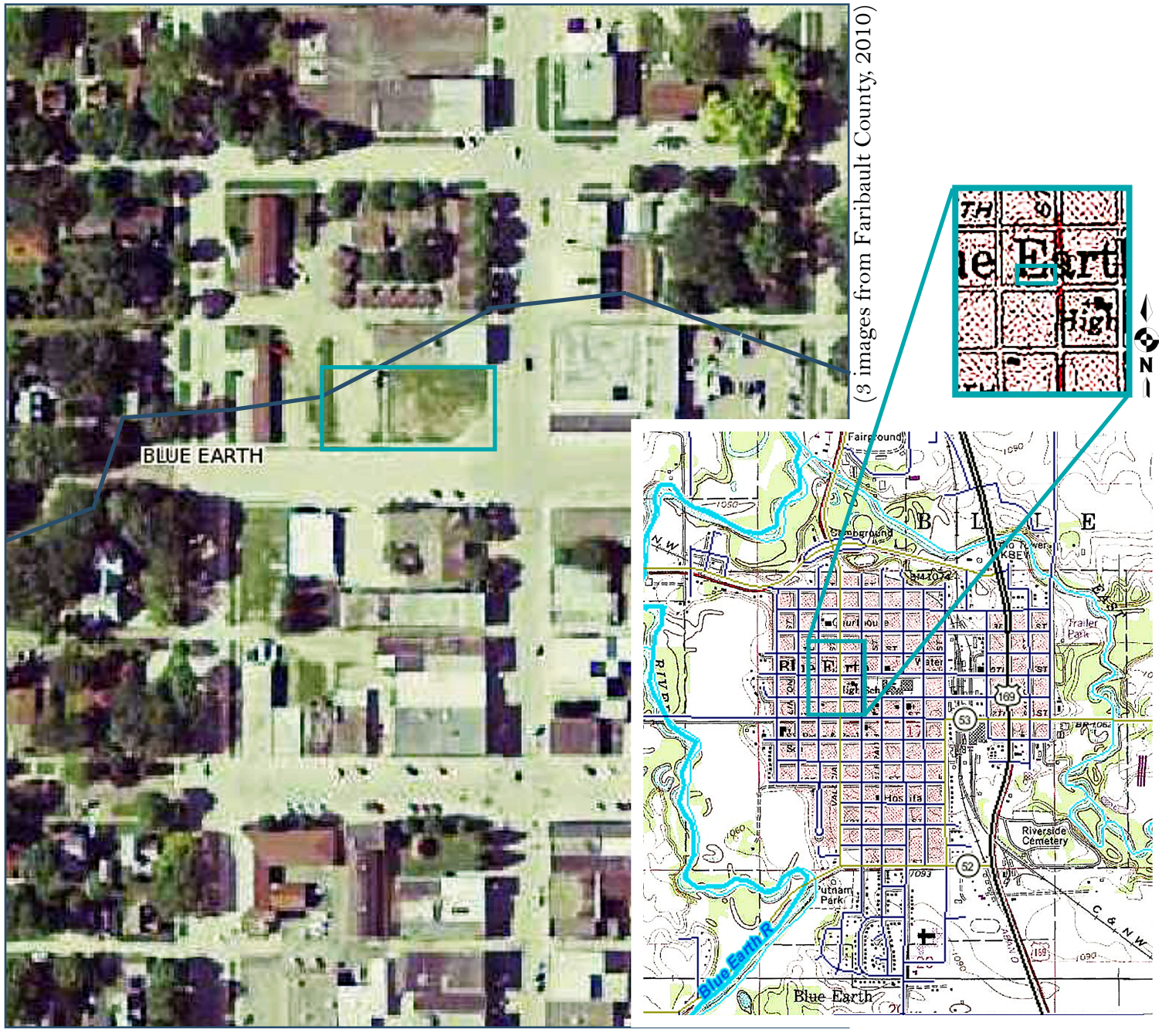
Utilities

All majory utilities are present on site. Overhead power lines run along the north side of Southern Jack's Bar and Grill. A large assortment of small businesses, banks, and the grocery store line Main Street, creating easy access to city utilities at this site.

At the site, the city taps into the power grid for a holiday lights display. At this particular corner, the featured light-up holiday item is a dreidel.


(Faribault County, 2010)
BLUE EARTH
Heavy Vehicular Traffic
Medium Vehicular Traffic
On-street Parking
Pedestrian Traffic
N

Topography



(3 images from Faribault County, 2010)

Site Character

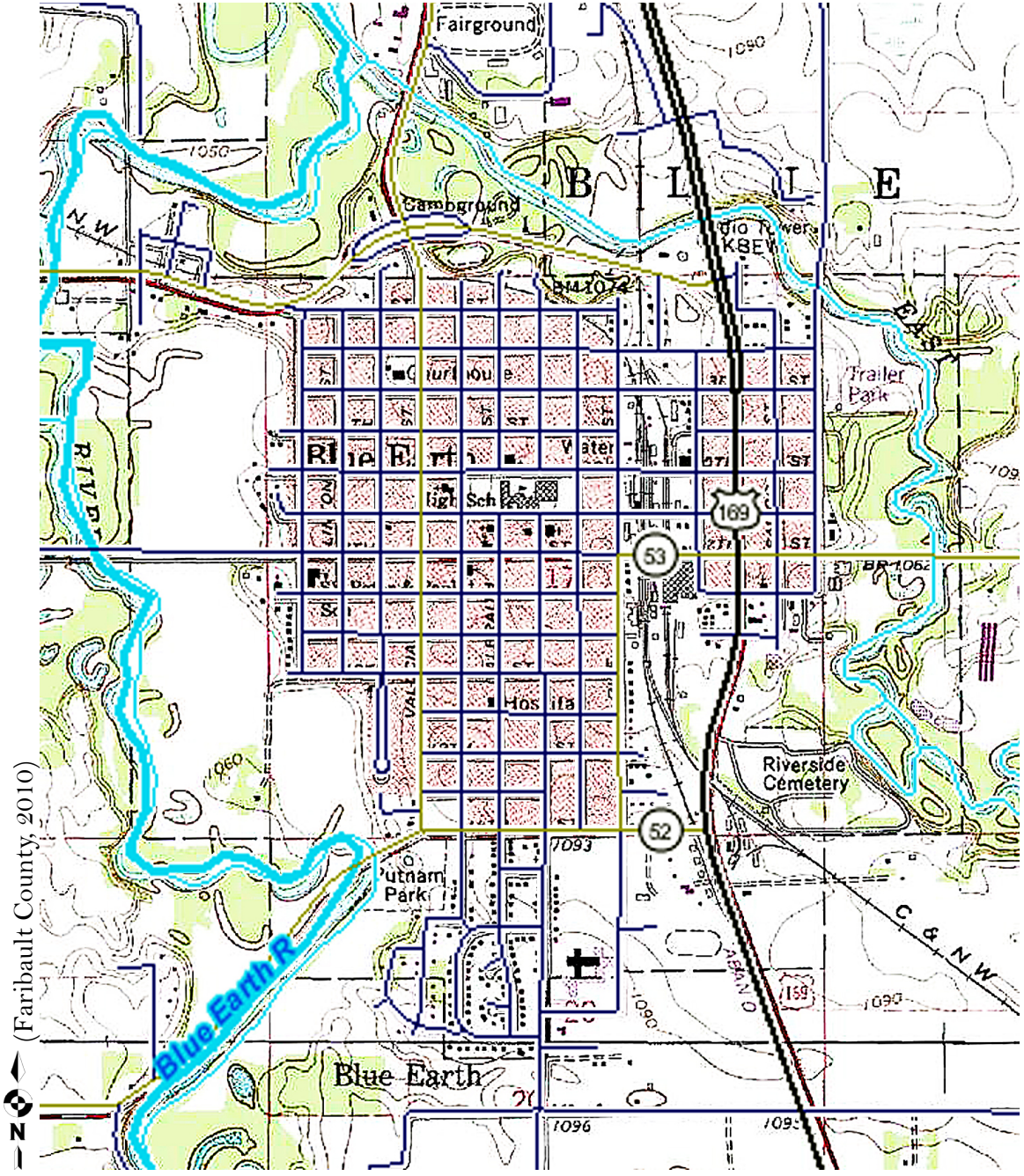
The site lies on an open corner at the north end of the general business area of downtown Blue Earth. The ground cover on site is lawn grass with an assortment of weeds mixed in. It is well maintained and mowed during the summer months, and the snowfall is largely undisturbed in the winter. The current owner of the site, who also owns Southern Jack's Bar & Grill, uses the site to store his large enclosed trailer and occasionally parks a vehicle on site, as well.

To the immediate north is the bar and grill, which has a good reputation in town. The building that houses the bar is nondescript and easily passed by unless a person is looking for it.

To the west is the old VFW parking lot, and beyond that is the STEP employment building. Old VFW parking is currently used on the western half by STEP, and usually lies empty on the eastern portion. The parking and driving surface is sandy gravel, with a weedy grass median. It appears that garbage service for Southern Jack's uses the drive for servicing the dumpster.

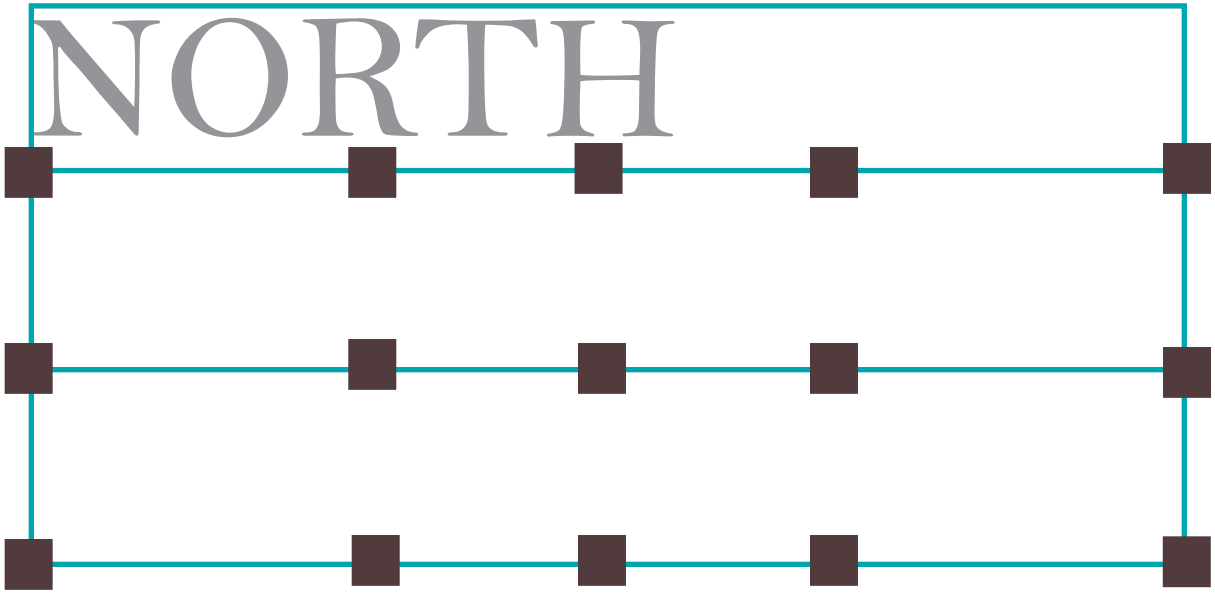
To the east, across Main Street, is a building that currently houses a framing shop and a connected building that is home to an odds-and-ends store. It is difficult to tell whether the two establishments are still in business and what the quality of the business is. Neither shop has a Main Street retail entrance.

Context Mapping: Points of Interest



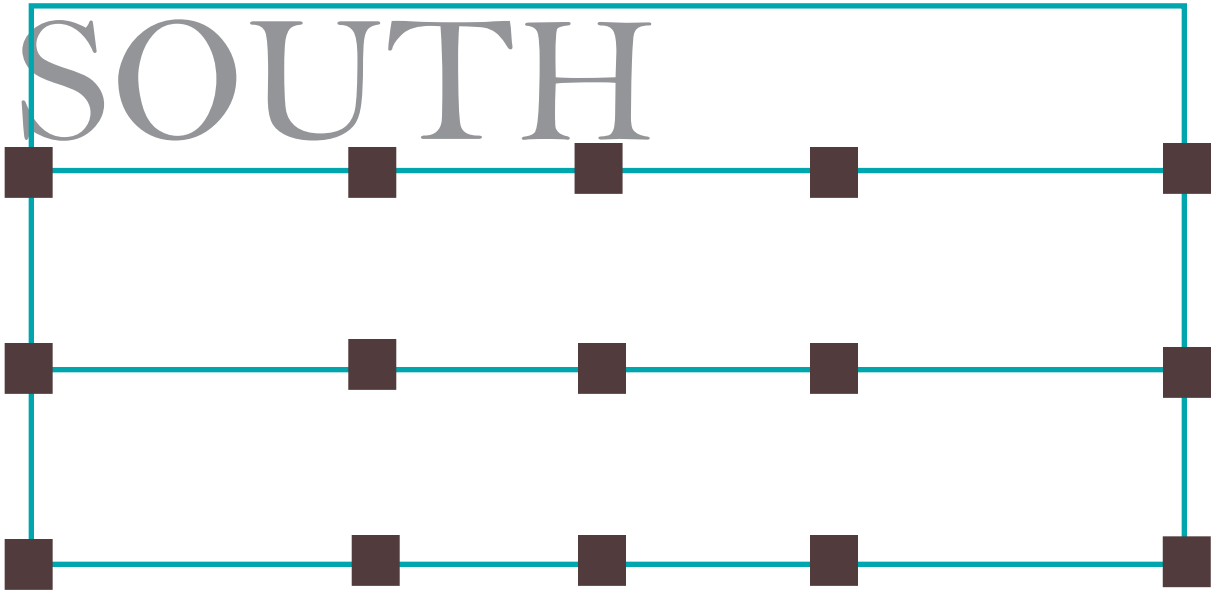
(Faribault County, 2010)

Site Reconnaissance: Photo Grids



EAST

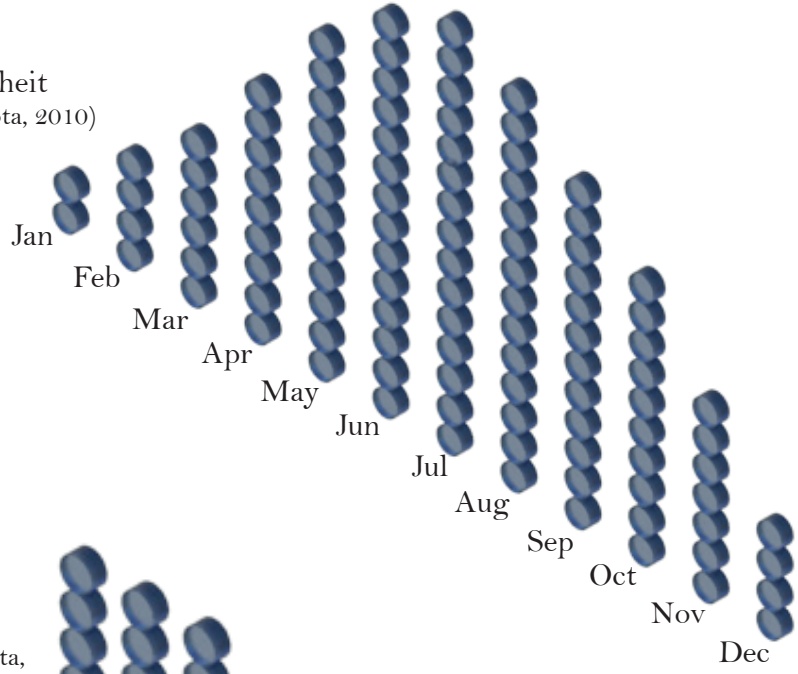
Site Reconnaissance: Photo Grids



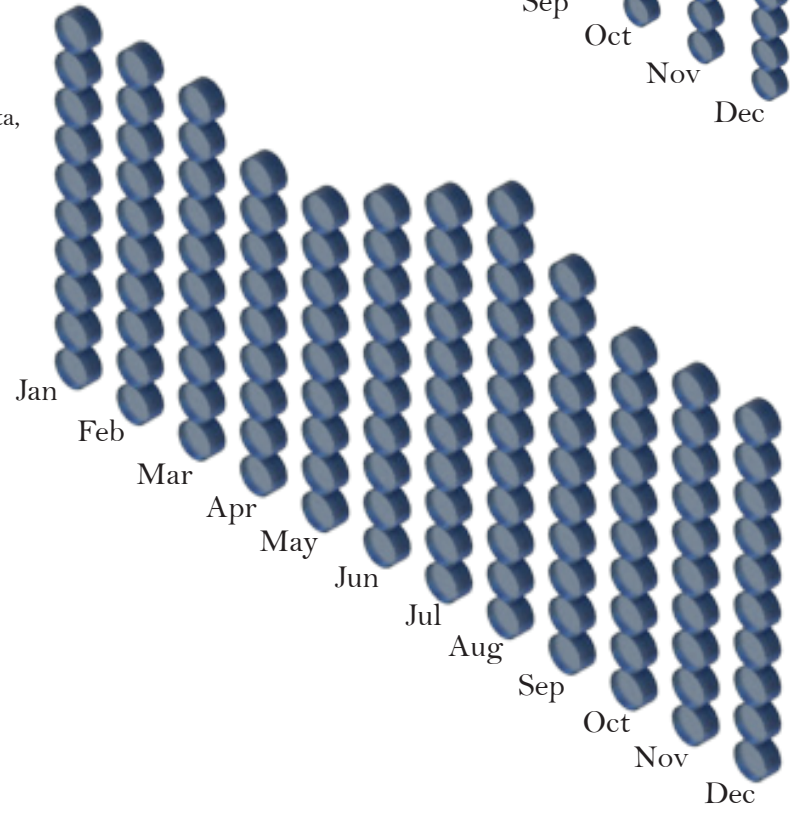
WEST

Climate Data

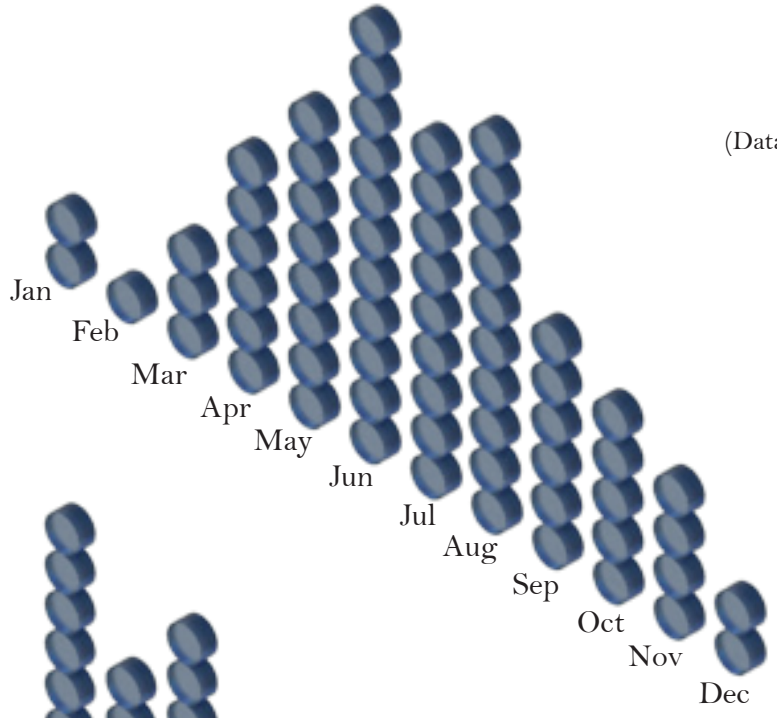
Average Temperature
1 Unit = 5 degrees Fahrenheit
(Data from Blue Earth, Minnesota, 2010)



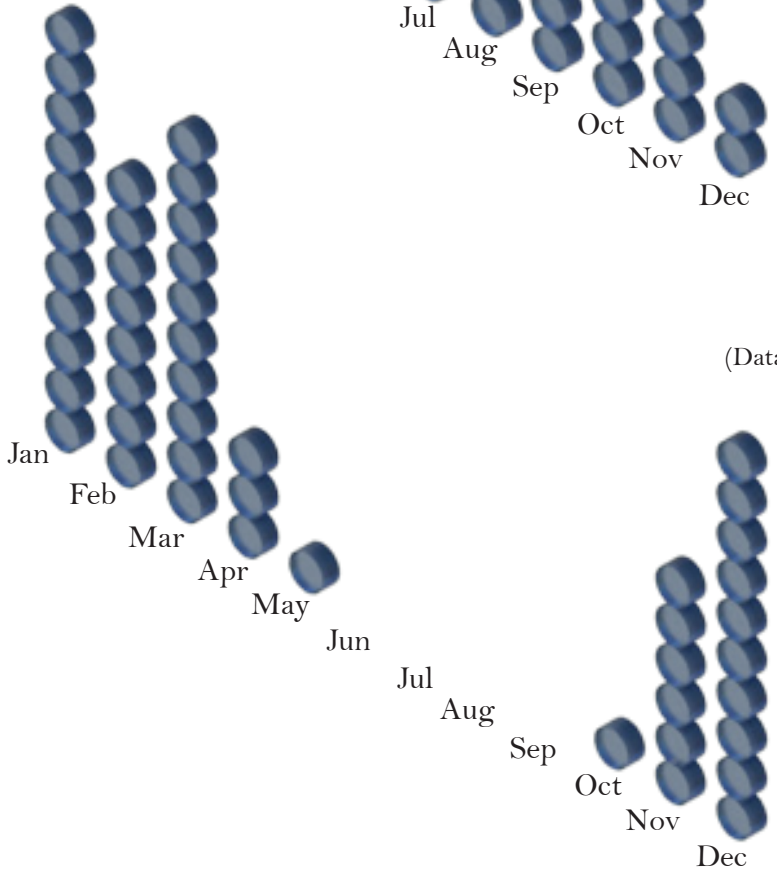
Humidity
1 Unit = 5%
(Data from Blue Earth, Minnesota, 2010)



Precipitation
1 Unit = 1/2 inch
(Data from Blue Earth, Minnesota, 2010)

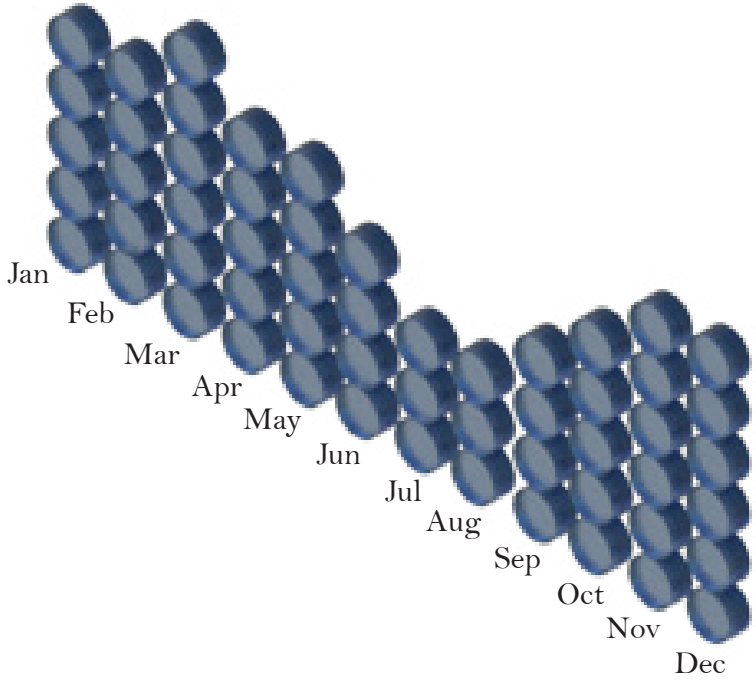


Snowfall
1 Unit = 1 inch
(Data from Blue Earth, Minnesota, 2010)



Climate Data

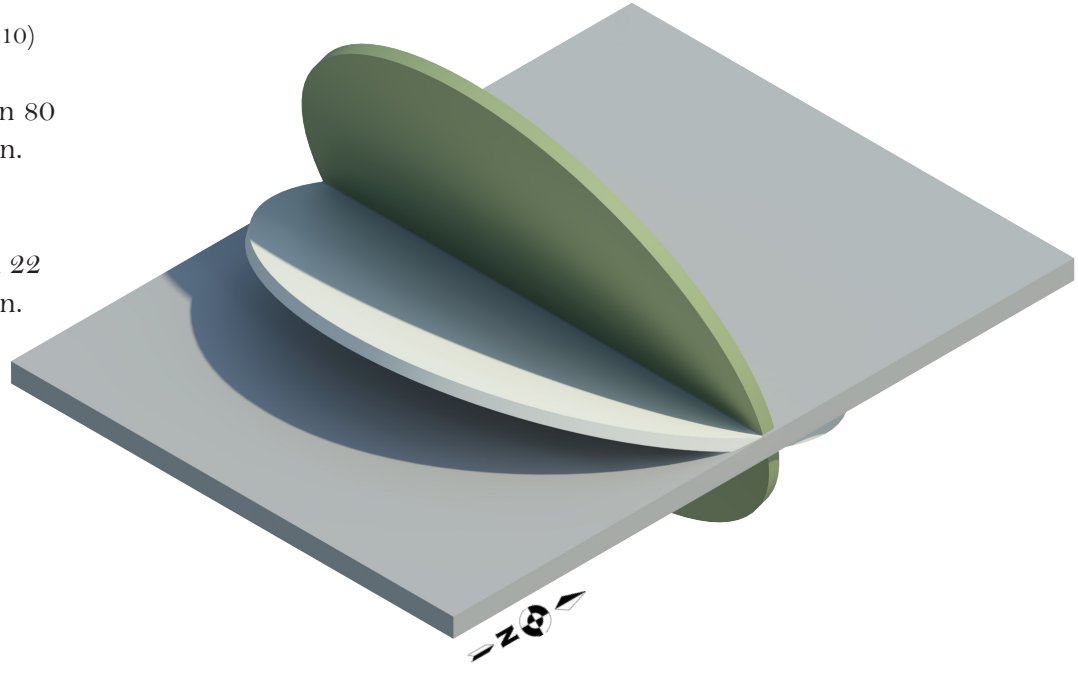
Cloudy Days
1 Unit = 10%
(Data from Blue Earth, Minnesota, 2010)

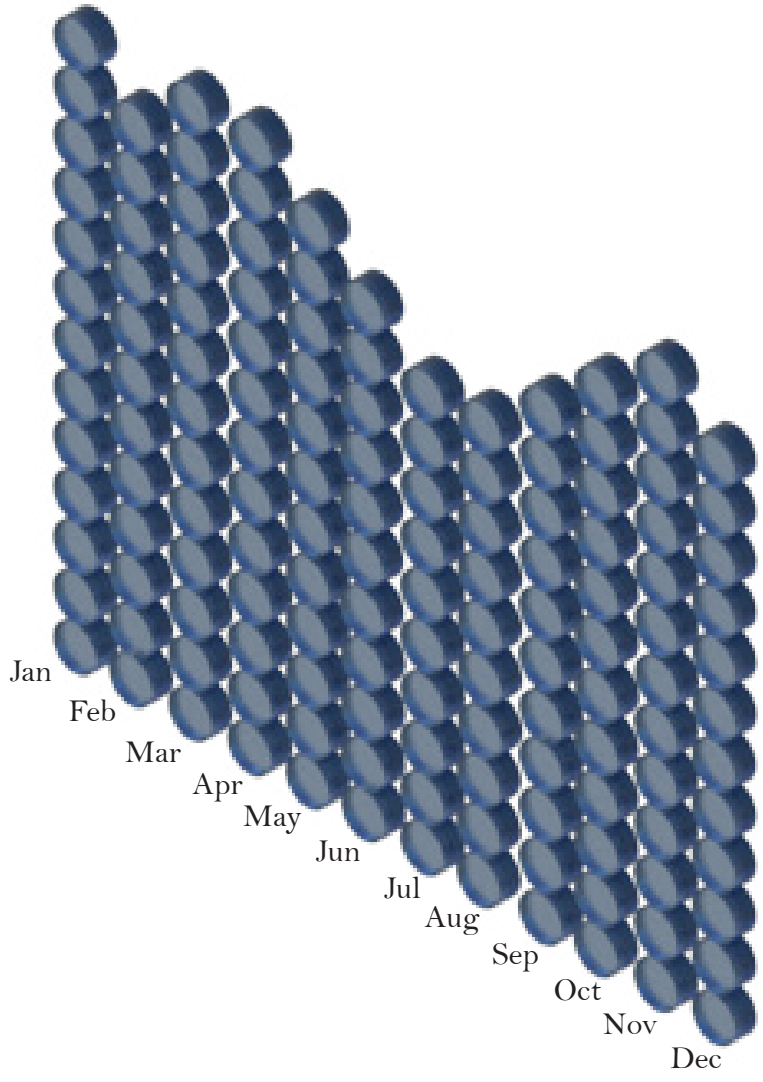


Sun Path Diagram
(Data from Tukiainen, 2010)

Summer Solstice: Sun 80 degrees above horizon.

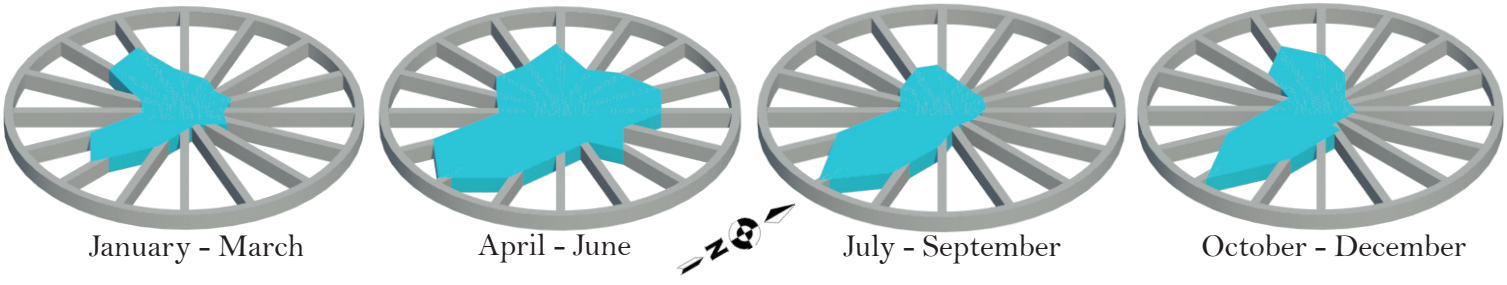
Winter Solstice: Sun 22 degrees above horizon.





Wind Speed
1 Unit = 1 mph
(Data from Blue Earth, Minnesota, 2010)

Wind Direction
(Data from Wind, 2004)



January - March | April - June | July - September | October - December

Programmatic Requirements

Patients

Reception	200 square feet
Waiting Areas (total)	600
CT Simulator	600
Ultra Sound	300
X-Ray	340
Exam Rooms (x10)	830
Chemotherapy (x10)	1100
Linear Accelerator Suite (x2)	3200

Employees

Records/Business	650
Pharmacy	300
Diagnostic Laboratory	480
Physic Laboratory	370
Mold Room	260
Digital Image Records Storage	300
Computer Reader Room	175
Doctors' Offices (x5)	550
Nurses' Offices	850
Nursing Station	360
Diagnostic Imaging Review	240
Employee Lockroom and Lounge	900

Public

3800 square feet	Nutrition Shop
4200	Café
500	Resource Library
4100	Interior Garden/Atrium

Support

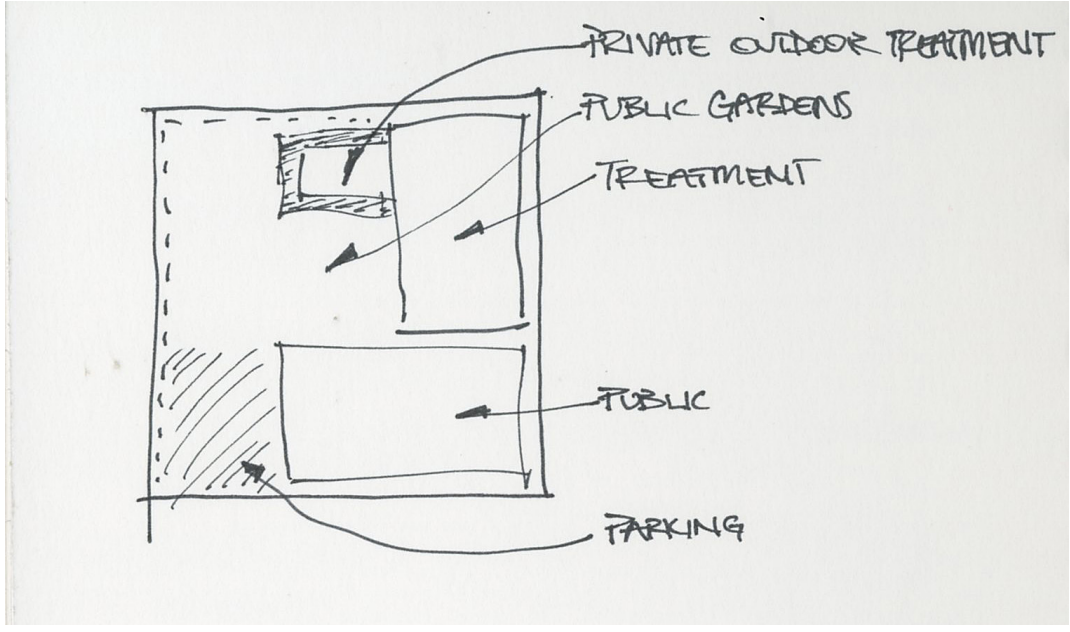
500	Restrooms (total)
7200	Horizontal and Vertical Circulation
1300	Mechanical/Electrical
1100	Storage

35,305	Total

Design Solution

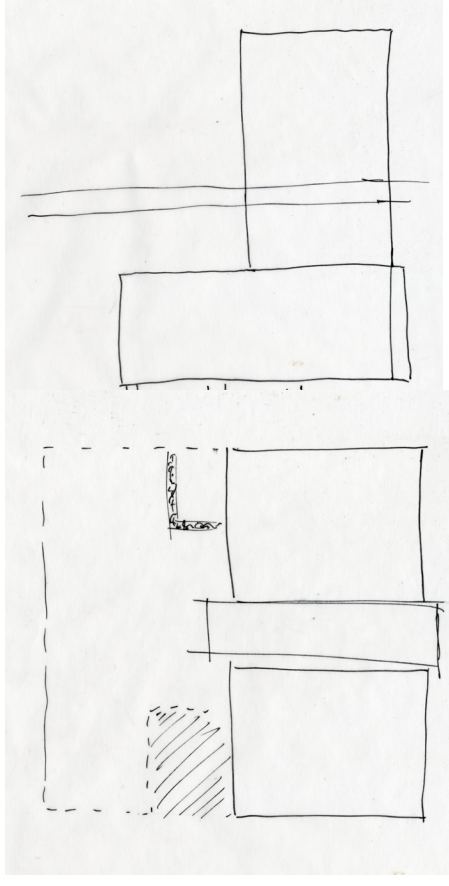
Process

Block Master Planning



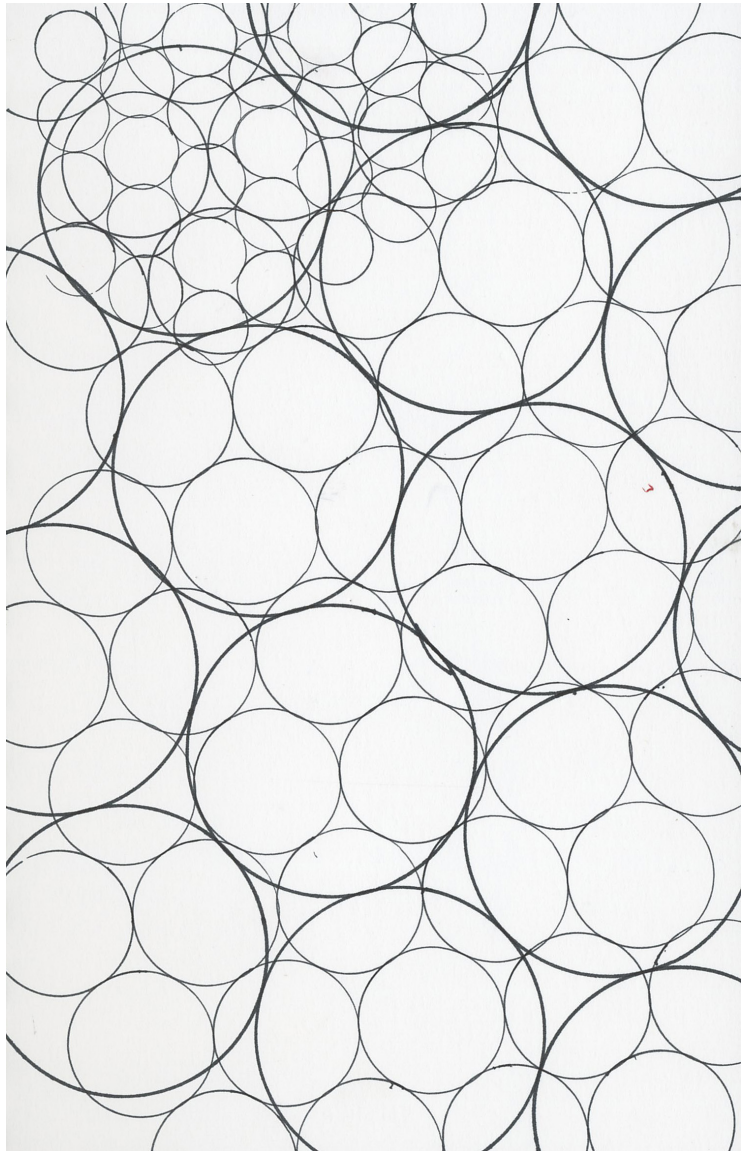
Process
Block Master Planning

In Blue Earth, there is a very strong east-west alley system. This grid is secondary to the street grid, and is present on nearly every block in town. The only block where the alley is not present in this area of town is directly west of the site. On that block, the alley has been overgrown with grass, and trees and shrubs are starting to creep past the yard boundaries. The site planning needed to reflect this important piece of the town's history while also acknowledging the emerging green-way developing to the west.



Process

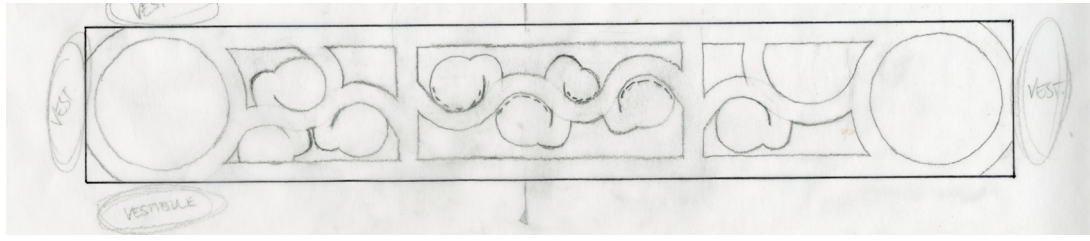
Initial Concept

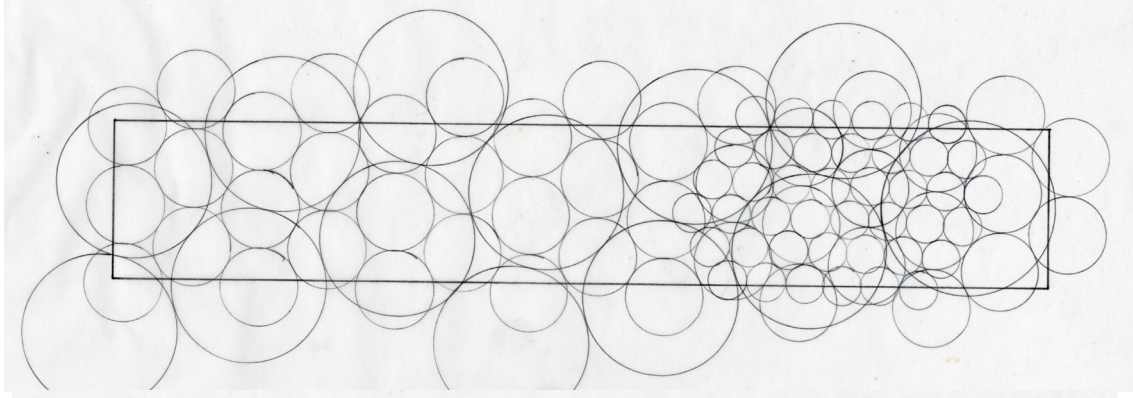


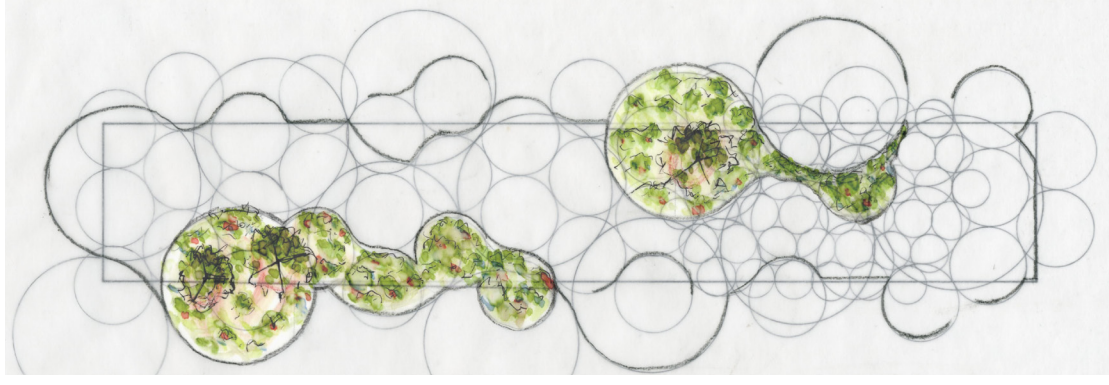
This sketch developed out of the cellular nature of cancer combined with the concepts of layering and morphing of the “ideal”.

Process
Atrium Design

The concept sketch ideas were initially applied to the atrium alley connection. Throughout the development, the interior space became quite organic in form.

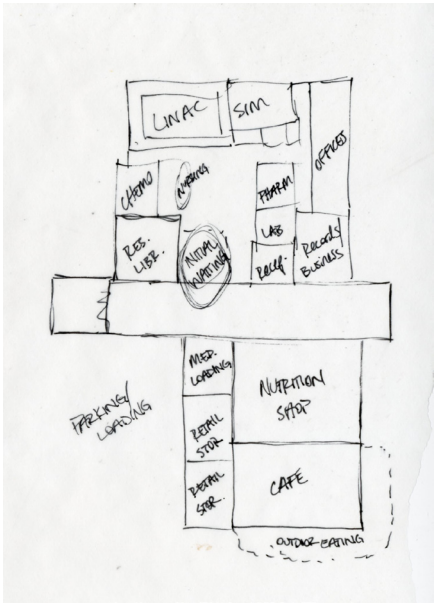


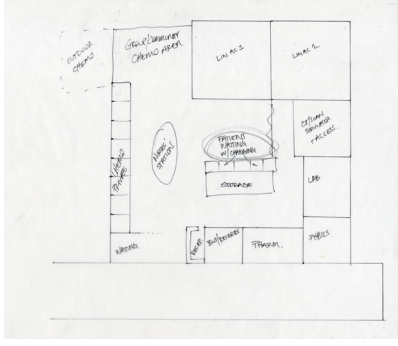


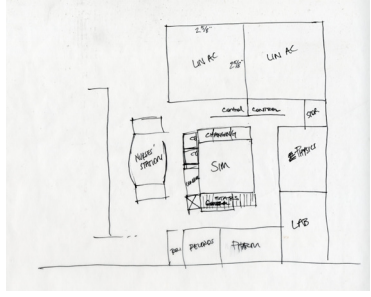


Process

Space Planning: First Attempts



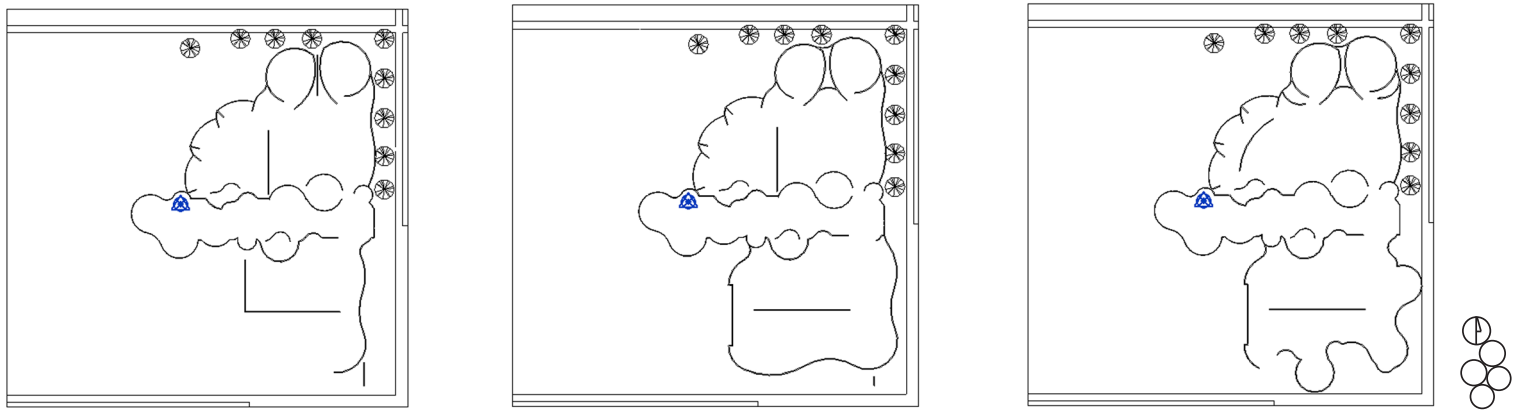




Concentration on pure square footages helped determine spatial ratios, but hemmed the design into a very rectilinear shape that did not flow with the organic nature of the atrium design.

Process

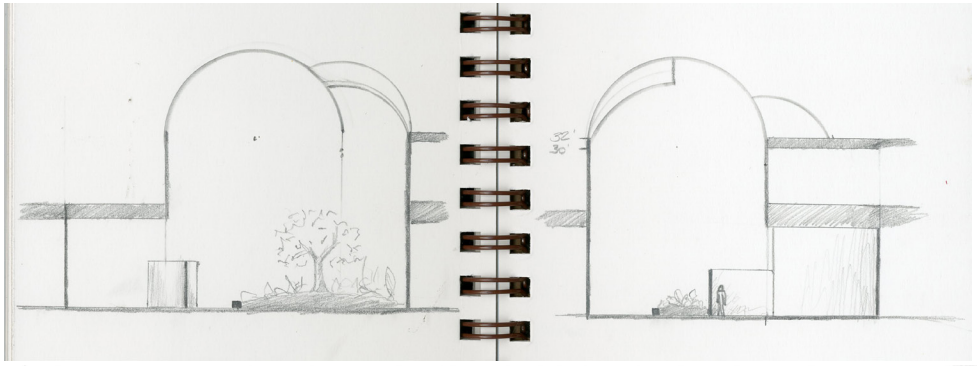
Space Planning: Development

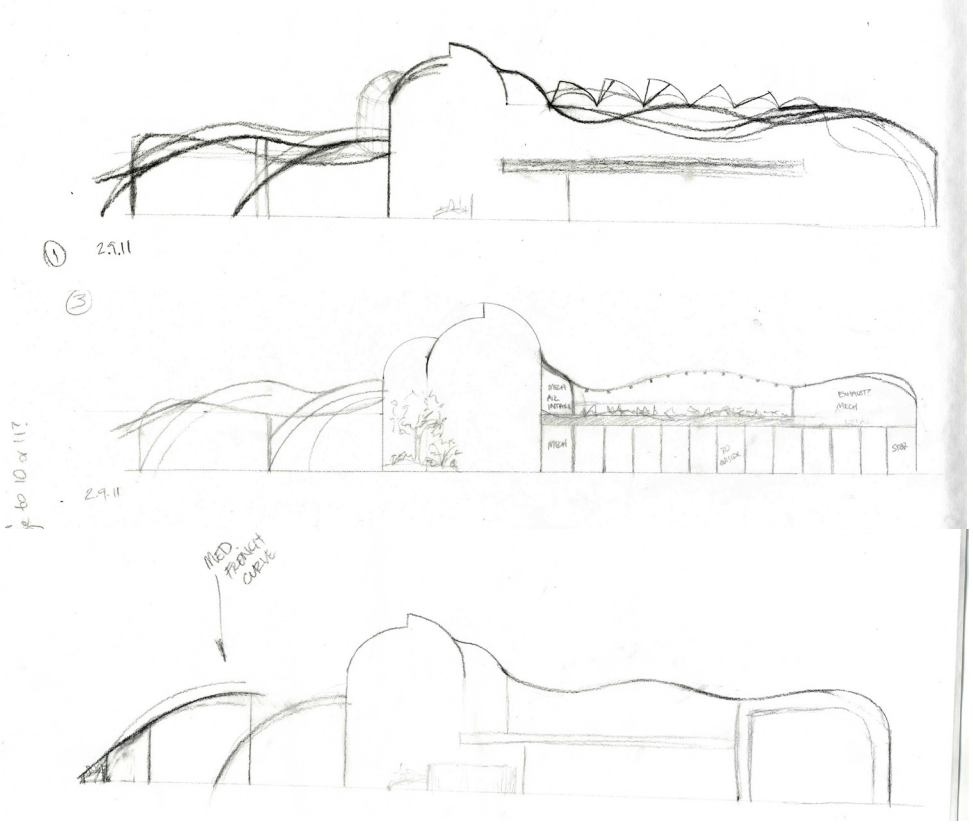


A more organic form began to develop, but the southern portion of the building was eluding resolution.

Process

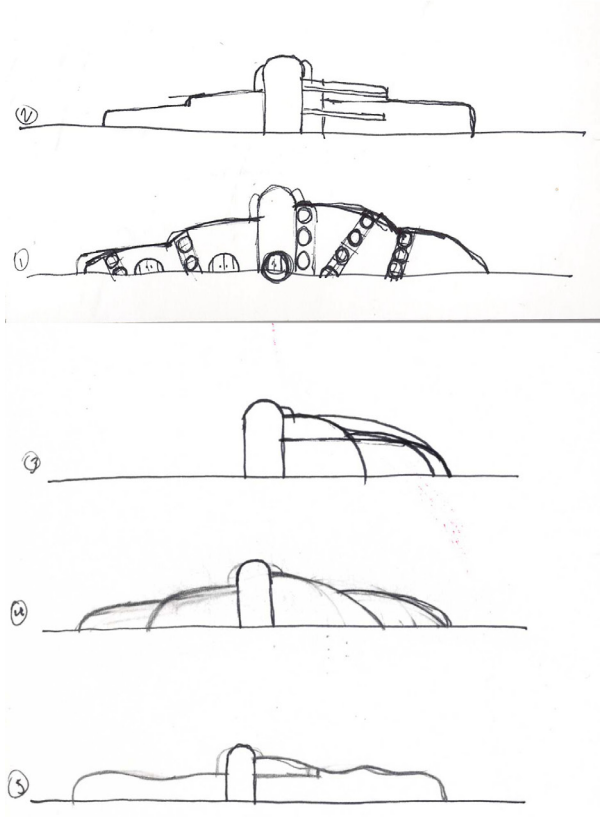
Space Planning: Section





Process

Space Planning: Cohesion

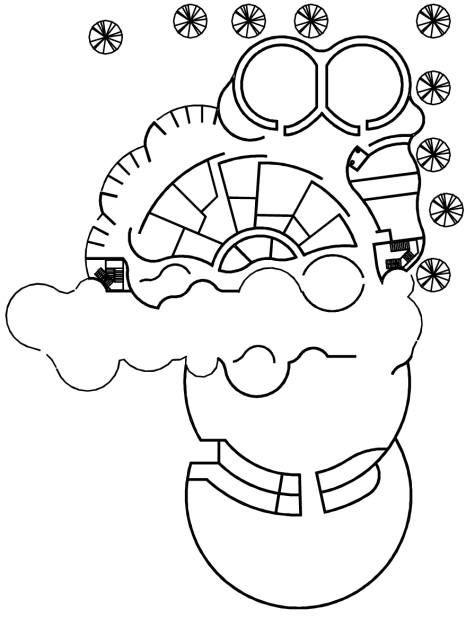


The building gained much definition through this series of sectional sketches. The form took on a much more simple, layered feel.

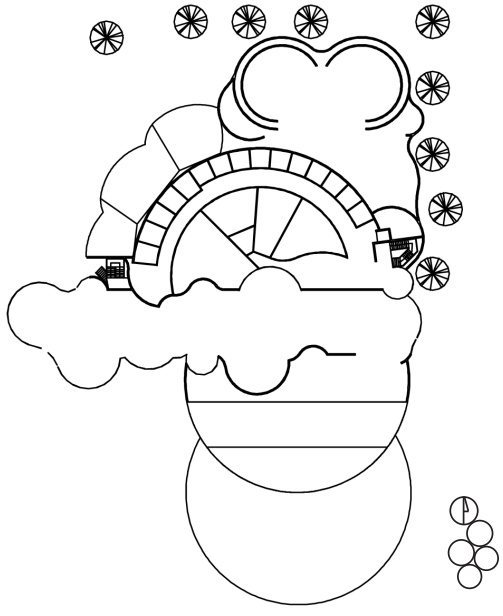
Process

Space Planning: Cohesion

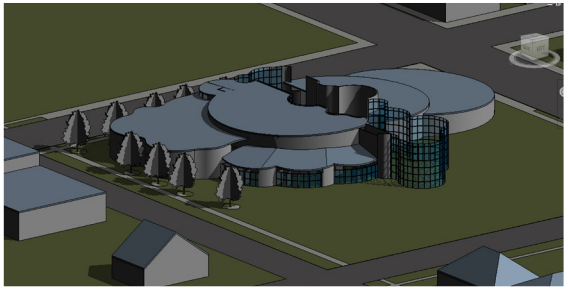
Level 1

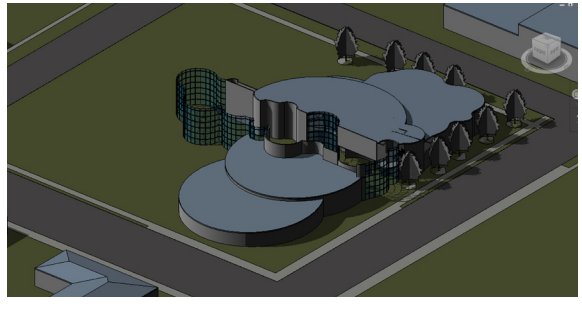


Level 2



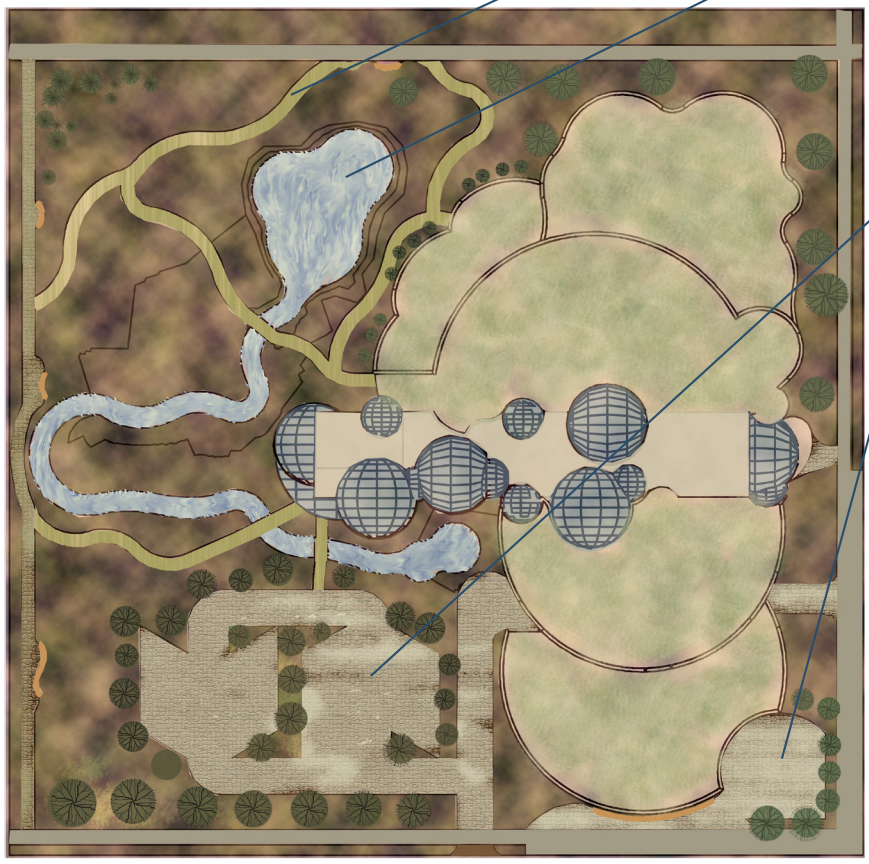
Rough plans began to take shape after the building section had more fully developed.





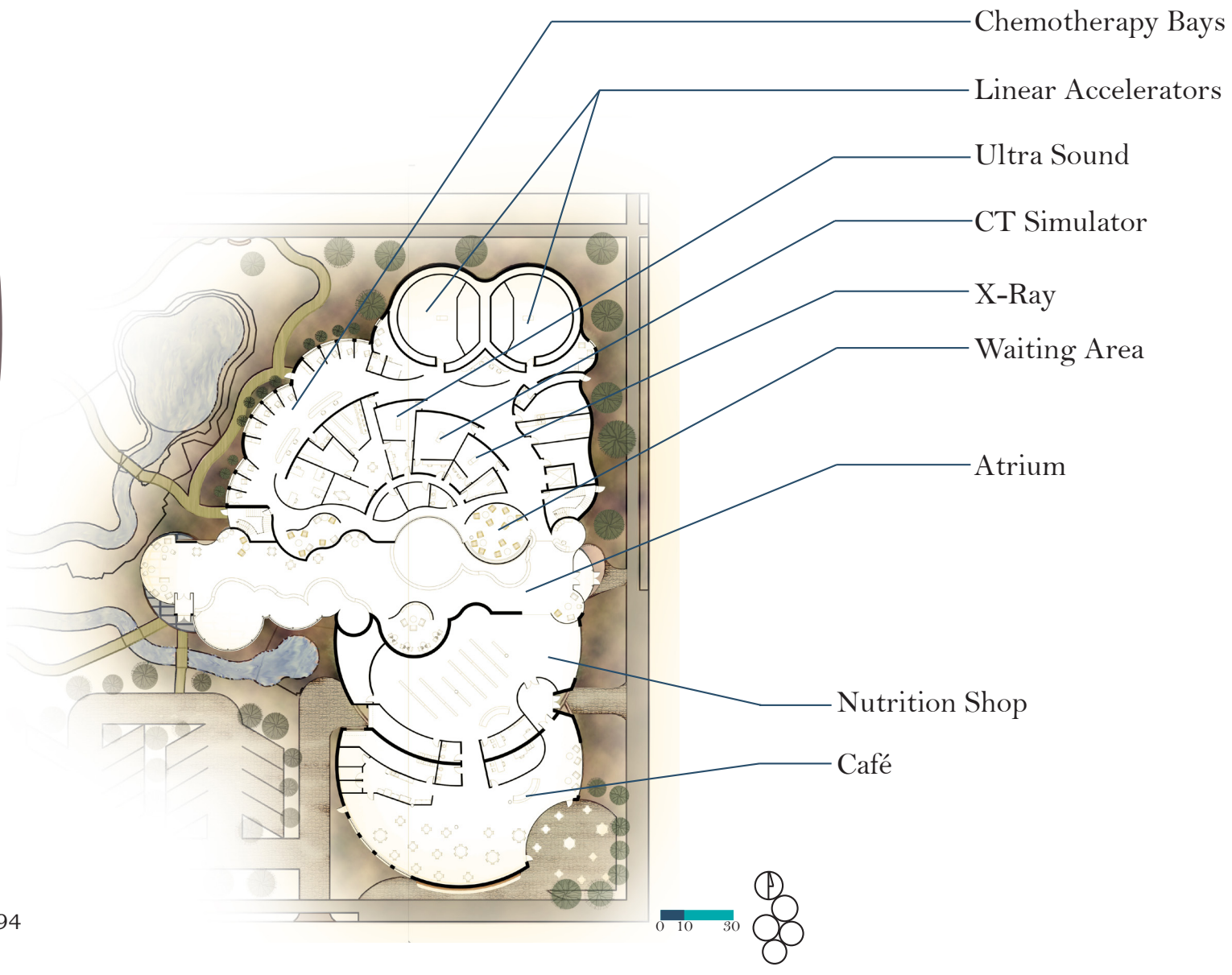
Final Design

Site Plan



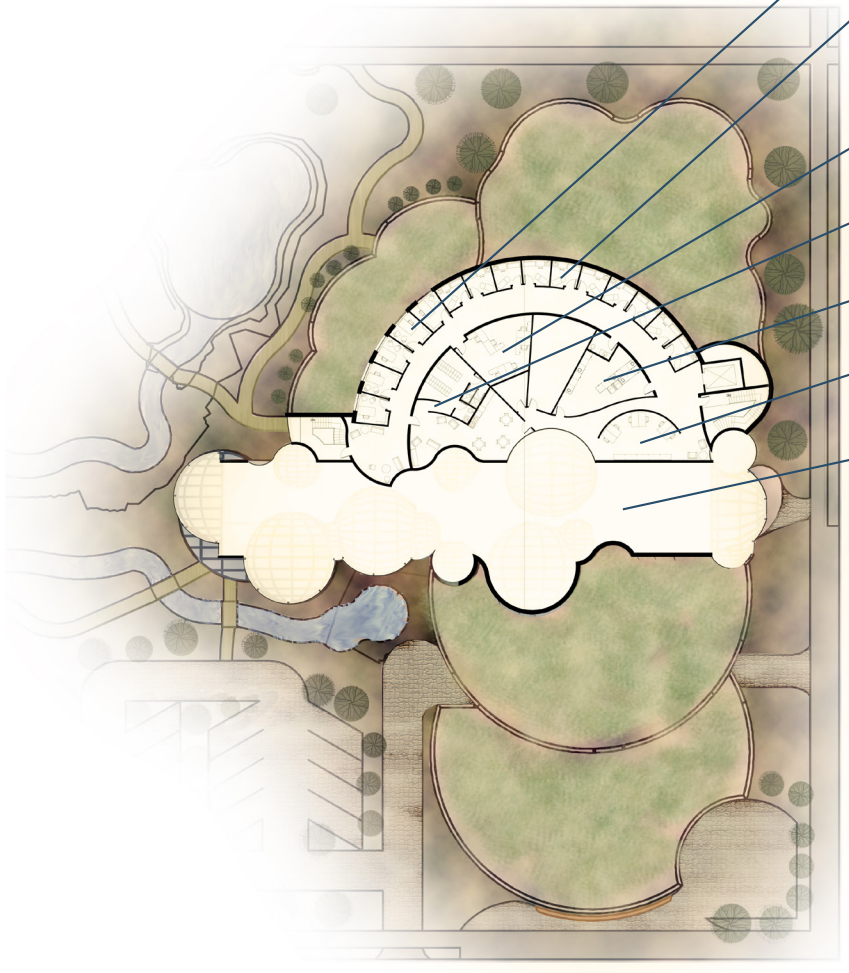
Final Design

Level 1 Plan



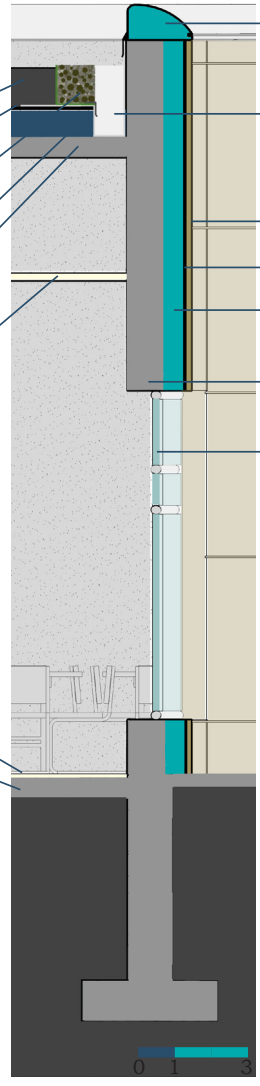
Final Design

Level 2 Plan



Final Design

Exterior Wall Detail



1' Growing medium

Root control layer and Roofing membrane

6" Gravel strip with metal gravel stop

8" Rigid insulation

6" Sitecast concrete slab

2'x2' Acoustic ceiling tile

Cork flooring

6" Sitecast concrete slab

Extruded zinc parapet cap with cleat and blown-in soy-based insulation

Gutter with flashing from parapet and roof assembly

Diamond plate copper cladding

Recycled plastic sheeting

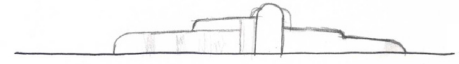
6" Metal studs with blown-in soy-based insulation

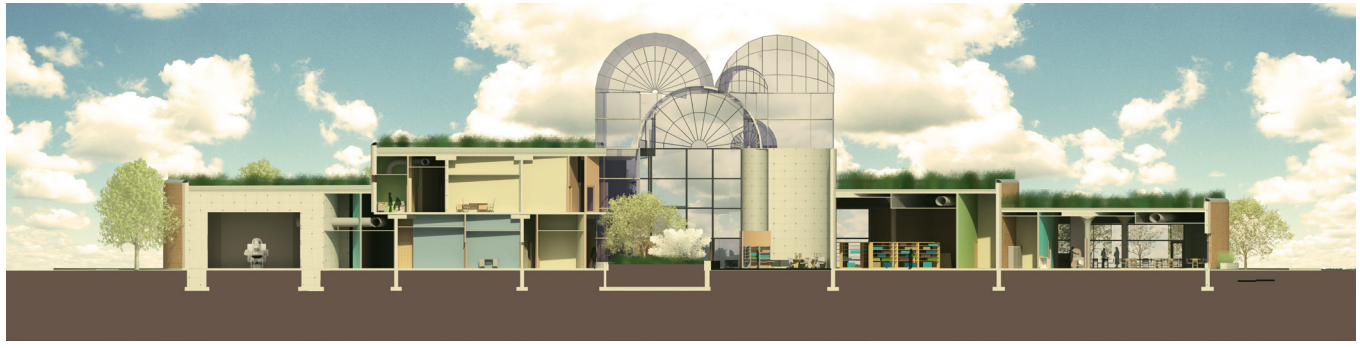
1' Sitecast concrete

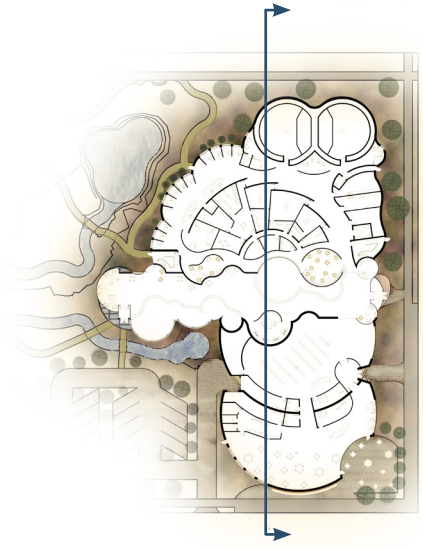
Low-E glazing

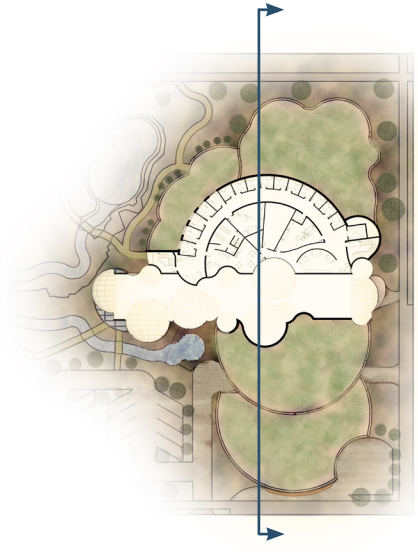
Final Design

Section Perspective



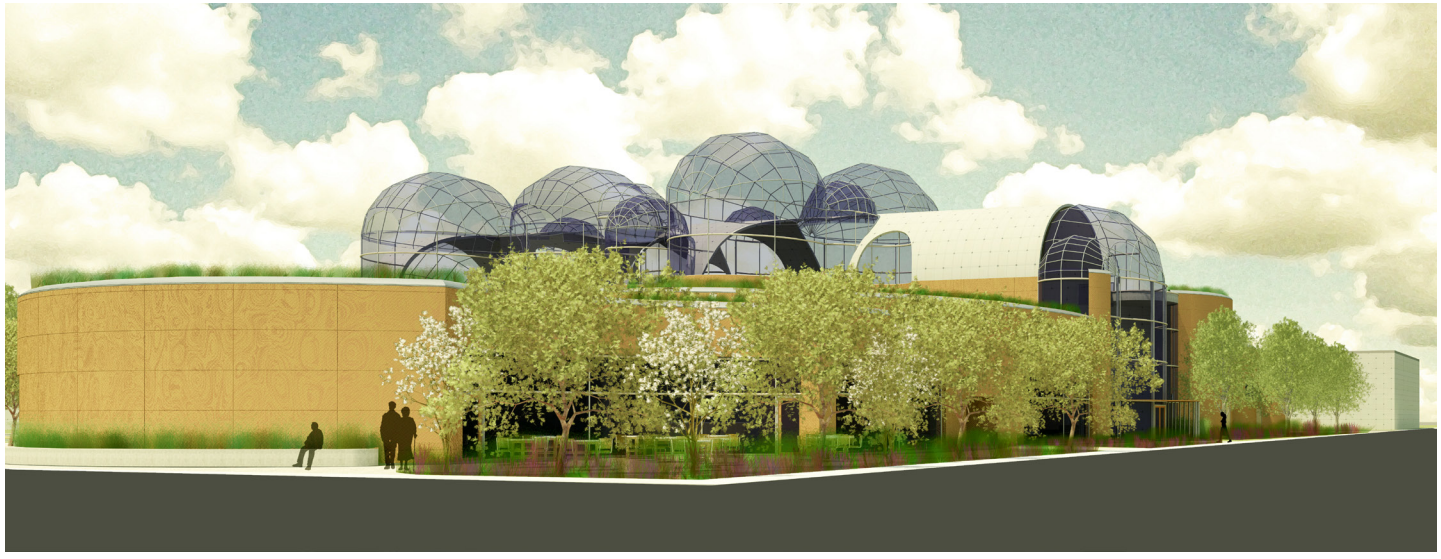






Final Design

View Looking North on Main Street



Final Design

Café Interior

Final Design

Atrium Interior

Final Design

Waiting Area

Final Design

Chemotherapy Bay

Cherry trees were specifically chosen as shade devices for the chemotherapy bays due to their year-round aesthetic qualities. In the winter, they retain their fruit, offering visual interest to otherwise bare branches. In the spring before the trees leaf out, animal life comes to eat last year's fruit.

Final Design

View From Northwest Prairie Restoration

Appendix

United Hospital District and Clinics

The UHD is a system of healthcare facilities in the towns of Blue Earth, Wells, and Winnebago. The primary services offered are family medicine and Obstetrics/Gynecology. Specialty services include cardiology, diagnostic imaging, diagnostic laboratory, diabetes education, ear, nose, and throat, emergency care, home health and hospice, Nutrition counseling, Occupational therapy, Ophthalmology, Orthopedics, Pathology, Physical therapy, Surgery, Urology

The closest medical facility with oncology service is the Fairmont Medical Center, which is an extension of the Mayo Health System. At this site, there is one oncologist on staff. Fairmont is approximately 30 minutes away from Blue Earth.

The next closest cancer center is at the Albert Lea Medical Center. This facility has 3 oncologists on staff. The ALMC is also part of the Mayo Health System. Albert Lea is approximately 45 minutes away from Blue Earth.

The largest oncology department in the area is the Andreas Cancer Center at Immanuel St. Joseph's in Mankato. There are five oncologists on staff at this center, which is again affiliated with the Mayo Health System. Mankato is approximately one hour away from Blue Earth.

If a patient encounters any sort of complications with their disease or treatment, he or she will most likely be sent to the Mayo Clinic in Rochester, Minnesota. Rochester is approximately two hours from Blue Earth.

Cancer Rates by County in Minnesota

What makes a cancer center important to this area?

In Faribault County, the average annual rate of cancer between 1998 and 2002 was 531.9 cases in males and 347.4 cases in females per 100,000 people (Minnesota Department of Health, 2008).

Adjusted for actual population (14,624 county residents), the occurrences are 78.2 cases in males and 51 cases in females on average each year. This means that on average, there are about 130 cases of cancer just in Faribault county every year. Surrounding counties (Martin, Freeborn, Steele, Waseca, Blue Earth) have very similar statistics, meaning that there are potentially upward of 650 cancer patients to treat every year in the south central Minnesota area.

With the current number of oncologists in the area, it averages to each oncologist treating 72 patients per year. Adding just five more oncologists would bring that average down to about 46 patients per doctor per year, creating more opportunities for individualized care.

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Personal Identification

Kerry Anderson

Address:
21 S. Broadway Apt. 301
Fargo, ND 58103

Email:
kerrydiane.anderson@gmail.com

Hometown:
Blaine, MN

"You are not merely here to make a living. You are here in order to enable the world to live more amply, with greater vision, with a finer spirit of hope and achievement. You are here to enrich the world."
--Woodrow Wilson

Photo courtesy of Kendra Wo[illegible] Valley Photography

"It is perhaps when our lives are at their most problematic that we are likely to be most receptive to beautiful things. Our downhearted moments provide architecture and art with their best openings, for it is at such times that our hunger for their ideal qualities will be at its height."

-Alain de Botton